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THE BOOK OF NATURE:

EMBRACING
A CONDENSED SURVEY
OF THE
Animal Kingdom
AS WELL AS SKETCHES
OF
Vegetable Anatomy, Geology, Botany,
Mineralogy, &c. &c.

EDITED BY AN ASSOCIATION OF
Scientific Gentlemen of
PHILADELPHIA.

VOL. I.

PUBLISHED BY SAML. C. ATKINSON, PHILADELPHIA.
1834
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THE

BOOK OF NATURE.

PREFACE.

In presenting the public with an extensive work, which will embrace about two hundred and forty very elegant plates on Natural History, it may be necessary to remark at the outset, that the letter-press which accompanies them is entirely compiled from books of standard authority, and that the work is intended as an index, which, while it exhibits the objects portrayed in their natural form with their nomenclature, is principally designed to furnish good drawings, and ideas on Natural History. With the aid of the first the learner will be enabled to pursue his studies without seeking for the living or stuffed specimen, while the letter-press will afford him the correct names of the animals, plants, birds, &c., and thus enable him to investigate their history, habits, &c. in the more voluminous treatises which contain them. One object with the publisher emphatically is, to place the plates within the reach of all at a rate so moderate that even the parlour scrap-book will lay it under contribution, even where no taste exists for the study of Natural History. This could not have been effected if the plates had been accompanied with an extended notice of each subject. The editor has therefore limited his manuscript to the prescribed space, in which, however, he has condensed such information as was thought to be most useful and intelligible. The plates are all prepared with reference to the Linnæan system, the improvements and modifications on which will be noticed in the letter-press.

THE STUDY OF NATURAL HISTORY.

The steady diffusion of a taste for the study of Natural History in this country, is extremely gratifying. It is this study which teaches us to look up from nature to the Author of nature. Nature is infinitely diversified, and yet each production makes its appearance at the time, and under the circumstances, which we should be led to expect. A plan so perfect and harmonious, of which the parts are so diversified, and yet so mutually promote the existence of each other,—which blend the sea, the land, and the air into one whole, and though always perishing, are always reproduced,—offers a field of contemplation which the longest life, and the most active mind, cannot exhaust; and it has the advantage over every other subject of study; it presents or awakens none of those bad passions and imperfections that present themselves when man and his works are the objects of our inquiry.

It has these farther advantages, that the study, instead of a labour, is a constant delight; that the details are quite as interesting as the whole; that the subjects which are too small to be seen by the naked eye are just as perfect in all their parts, and as wonderful in the use of them, as those which are of the most huge dimensions. The little green moss that is as a pin's point upon a wall or the bark of a tree, or the fungus that makes a barely visible speck upon a leaf, is as perfect in its structure, and as full of life, as the pine or the oak that rises majestically over the forest, and exhibits itself to an entire country, or as a landmark for the seaman. The aphis, that scarcely crumples the rose-leaf, or the animalculæ, of which myriads do not render a drop of water turbid, are as equally complete, and in some respects much more curious, than the horse or the elephant. Of the aphis, nine distinct generations, all females, succeed each other every summer, and yet each produces a numerous progeny; and some of the animalculæ increase in number by a spontaneous division of the little bodies of those previously existing.

In order to understand the subject, we must, indeed, study the small as well as the great, the common as well as the rare. The most uncommon and majestic animals cannot tell us more than the worm we trample under foot, or the caterpillar we destroy as a nuisance. Nor does the utility diminish with the size. Silk, the finest substance with which we are clothed; carmine, the finest colour with which we can paint; and the very ink with which we write, are all the productions of little insects.

In contemplating the structure of any plant or animal, however common, and however on that account overlooked or disregarded, we may find finer applications of mechanical art, and nicer processes in chemistry, than the collected art of the whole human race can boast of. That the vegetable principle in an acorn should be chemist enough to fabricate oak timber, and bark and leaves and new acorns; and mechanic enough to rear the tree in the air against the natural tendency of gravitation, and in spite of the violence of the winds, and do all this by means of a little portion of matter that can be kept for a considerable time as if it were dead, is truly astonishing. It is equally demonstrative of power and wisdom in Him who gave the impulse, that out of the same soil and the same atmosphere, each plant should elaborate that which properly belongs to it; that the flower of one plant should be crimson, that of the next yellow; that one should delight us with its perfume, and the very next one offend us by its fetor; or that food, medicine, or a poison, should be found the closest neighbours.

In the single department of Botany, we have thus not only a fund of the most curious information, but of information which is practically useful at every step. Even from the mere forms of vegetables we have some of the choicest of our ornaments, and have taken some of the most useful hints in our architecture. The engineer who first succeeded in fixing upon the dangerous rocks of Eddystone a light-house that resisted the violence of the raging sea, moulded its contour from the bole of a tree which had withstood the tempests of ages; and the model was found so admirably adapted to the purpose, that it has been copied in similar cases ever since.

The sure way to become naturalists, in the most pleasing sense of the term, is to observe the habits of the plants and animals we see around us, not so much with a view of finding out what is new or uncommon, as of becoming well acquainted with what is of every-day occurrence. Nor is this a task of difficulty, or one of dull routine. Every change of elevation or of temperature is accompanied by a variation both in plants and animals; and every season and week, nay almost every day, brings something new; so that while the book of nature is so accessible, it is as varied as the books of a library. In whatever place or at whatever time one may be disposed to take a walk,—in the most sublime scenes or on the bleakest wastes, on arid downs, or by the margins of rivers or lakes, inland or by the sea shore, in the wild or on the cultivated ground, and in all kinds of weather and at all seasons of the year,—nature is open to our inquiry. The sky over us, the earth beneath our feet, the scenery around, the animals that gambol in the open spaces, those that hide themselves in coverts, the birds that twitter on the wing, sing in the grove, ride upon the wave, or float along the sky, with the fishes that tenant the waters, the insects that make the summer air alive, all that God has made, is to us for knowledge and pleasure, and usefulness and health; and when we have studied and known the wonders of his workmanship, we have made one important step toward the adoration of his omnipotence, and obedience to his will. Should our present publication increase the resources of amusement and instruction to the public, or contribute to the results alluded to above, we shall feel amply rewarded for our humble labours in this compilation.

PLATE I.—ORNITHOLOGY.

Fig. 1. *Crow Blackbird.* (*Gracula Quiscula*, Linn. *Icterus Versicolor*, Cuv.)

This bird is usually denominated the Crow Blackbird; it is gregarious, and omnivorous, its food consisting of insects, corn, and small grains. In the early settlement of the country, the havoc made by these birds was so great, that a premium was paid for their heads. But they may be said to be friends of man rather than enemies, as they destroy all the noxious worms, grubs, and caterpillars, which, if allowed to multiply unmolested, would consume so great a portion of the produce of the country, as to desolate it with famine. The great Crow Blackbird, says Bonaparte, is more than sixteen inches long, and twenty-two in extent. The female is considerably shorter. The Great and Common Crow Blackbirds, adds the same author, are both alike distinguished by the very remarkable boat-like form of the tail, but the great difference of size and appearance obviously proves them to be specifically different. The Great Crow Blackbird inhabits the northern parts of the Union, where it is called the Jackdaw. Their disposition is extremely social, frequently mingling with the Common Crow Blackbird. About the end of November they leave even the warm region of Florida, to seek winter quarters farther south, probably in the West Indies, assembling previous to their departure in very large flocks. The males appear to migrate earlier than the females, as not more than one female is observed for a hundred males, (distinguishable by their greater size,) in the last flocks. Of the Common Crow Blackbird we can add little to what is furnished by Wilson, Vol. III. p. 44. See also Bonaparte's Ornithology, Vol. I. p. 42. The latter author observes, that they are subject to become either wholly or partially albinos, from which circumstance numerous errors have been introduced into the pages of ornithological works.

Wilson states, that a singular attachment frequently takes place between this bird and the Fish Hawk. " The nest of the latter is of very large dimensions, often from three to four feet in breadth, composed, externally, of large sticks, or fagots, among the interstices of which sometimes three or four pair of Crow Blackbirds will construct their nests, while the Hawk is sitting or hatching above. Here each pursues the duties of incubation and of rearing their young; living in the greatest harmony, and mutually watching and protecting each other's property from depredators. But their nests are usually built on the tallest trees, sometimes ten or fifteen being on the same tree. The eggs are five, of a bluish colour, marked with large spots and straggling streaks of black and brown. They rarely produce more than one brood in a season.

Fig. 2. *Bald Grakle.* (*Gracula Calva*, Linn. *Eulabes Gravanus*, Cuv.)

The length of this remarkable species is ten inches. Most of the head is naked and of a flesh colour, which on any particular irritation is said to become of a deep red. In its shades of colour, the plumage of this bird varies. It is a native of the Philippine Islands, where it builds in the hollow of the Cocoa-nut-tree. It feeds on fruits, is extremely voracious, and is said to have a loud chattering note.

Fig. 3. *Dial Grakle.* (*Gracula Saularis*, Linn. *Lanius Saularis*, Cuv.)

This species, which is described by Edwards under the name of the Little Indian Pye, is a native of India. By the European residents it is called the Dial Bird; it is of a very pugnacious disposition, somewhat smaller than a thrush, and its colour black, glossed with blue and purple. The wings are brown and black; the middle quill feathers, the side feathers of the tail, and the abdomen, white; the bill dull orange colour, and the legs brown. The female differs in being of a browner black than the male, and in having the white parts less clear and distinct.

Fig. 4. *King Bird of Paradise.* (*Paradisea Regia*, Cuv.)

This is the smallest of all the Paradise birds yet discovered, not exceeding the size of a lark. The two tail feathers are about six inches long, and terminate in the most beautiful manner, in a moderately-broad gold-green web, disposed into a flat spiral of nearly two convolutions. It is called the *King Bird* by the Dutch, and is a rare species.

Fig. 5. *Greater Bird of Paradise.* (*Paradisea Apoda*, Linn. and Cuv.)

The Greater Bird of Paradise is a native of India and the Philippine Islands, and is said to be very voracious, feeding both on animal and vegetable food, and is particularly fond of locusts and grasshoppers; to eradicate the former, they were introduced into the island of Bourbon, where they proved very serviceable. This bird, according to Buffon, is of the same lively and imitative disposition with the Indian Grakle; and when young, is easily taught to speak. If kept in the poultry-yard, it spontaneously mimics the cries of all the domestic animals—hens, cocks, geese, dogs, sheep, &c.; and this chattering is accompanied by many singular gesticulations.

It is said of the Great Paradise Bird, that in their native state they fly in flocks of about thirty or forty, led by a single bird which the natives call their king, but which is said to be of a distinct species, of a black colour with red spots. It is pretended that when this bird settles, the whole flock settle also, in consequence of which they sometimes perish; since, if their leader happens to settle on the ground, they are not able to rise on account of the peculiar structure of their feathers; nor can they fly in the wind, which would totally disorder their long flowing plumes; they are therefore observed always to fly against the wind, and to abstain altogether from flight during a storm, which would infallibly throw them on the ground. One instance has occurred of this elegant bird having been brought in a living state into England; it had, however, entirely lost the beautiful floating side-feathers, and did not long survive its arrival. We are not aware that a living specimen ever reached our shores.

Fig. 6. *Golden Bird of Paradise.* (*Paradisea Aurea*, Linn. and Cuv.)

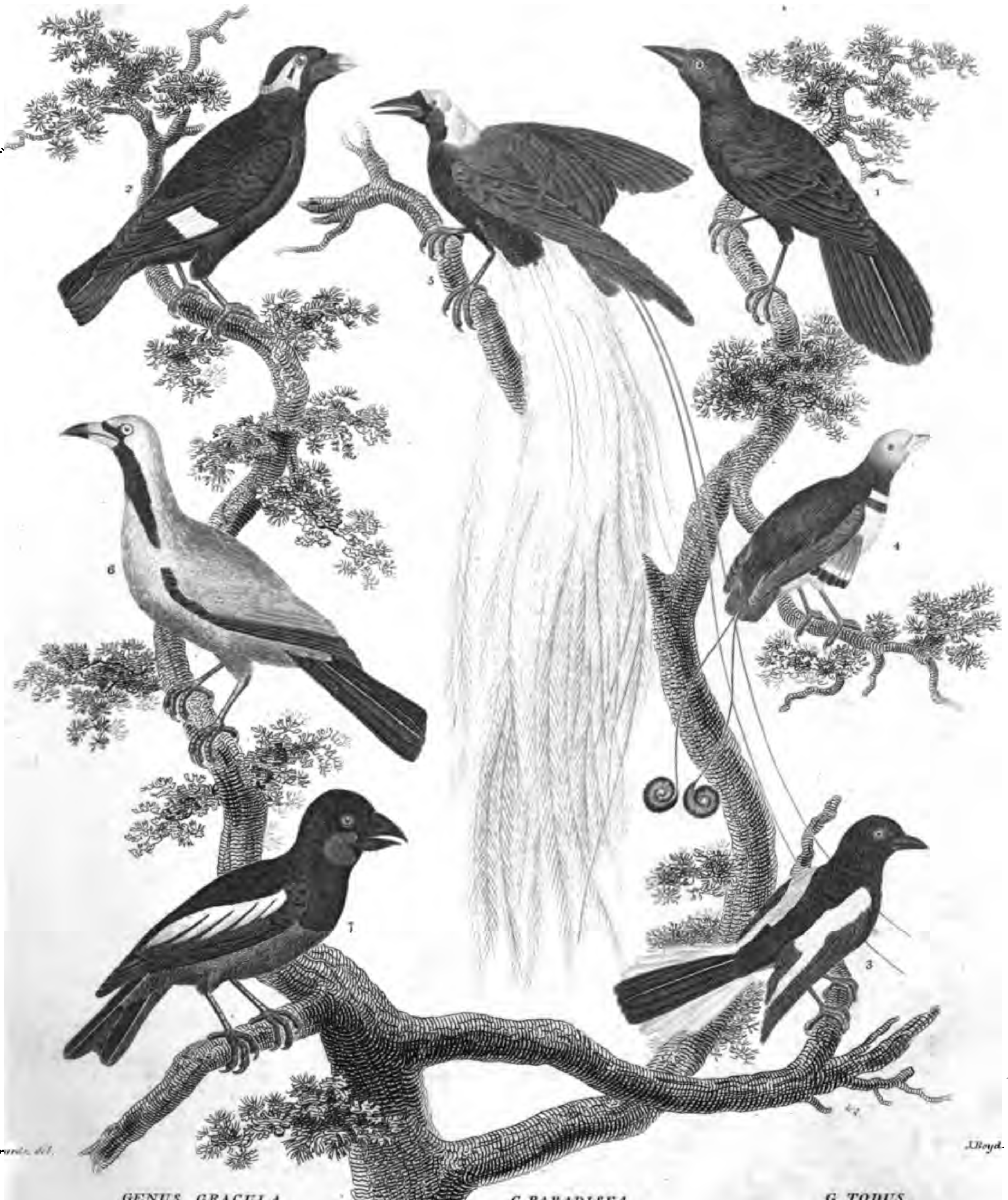
This very beautiful bird departs in some degree from the general habit or character of the Birds of Paradise, and has

Linn. Syst.

ORNITHOLOGY.

PLATE

Divn 1st Land Birds—Order 2nd PICÆ.



Syd. Edwards. del.

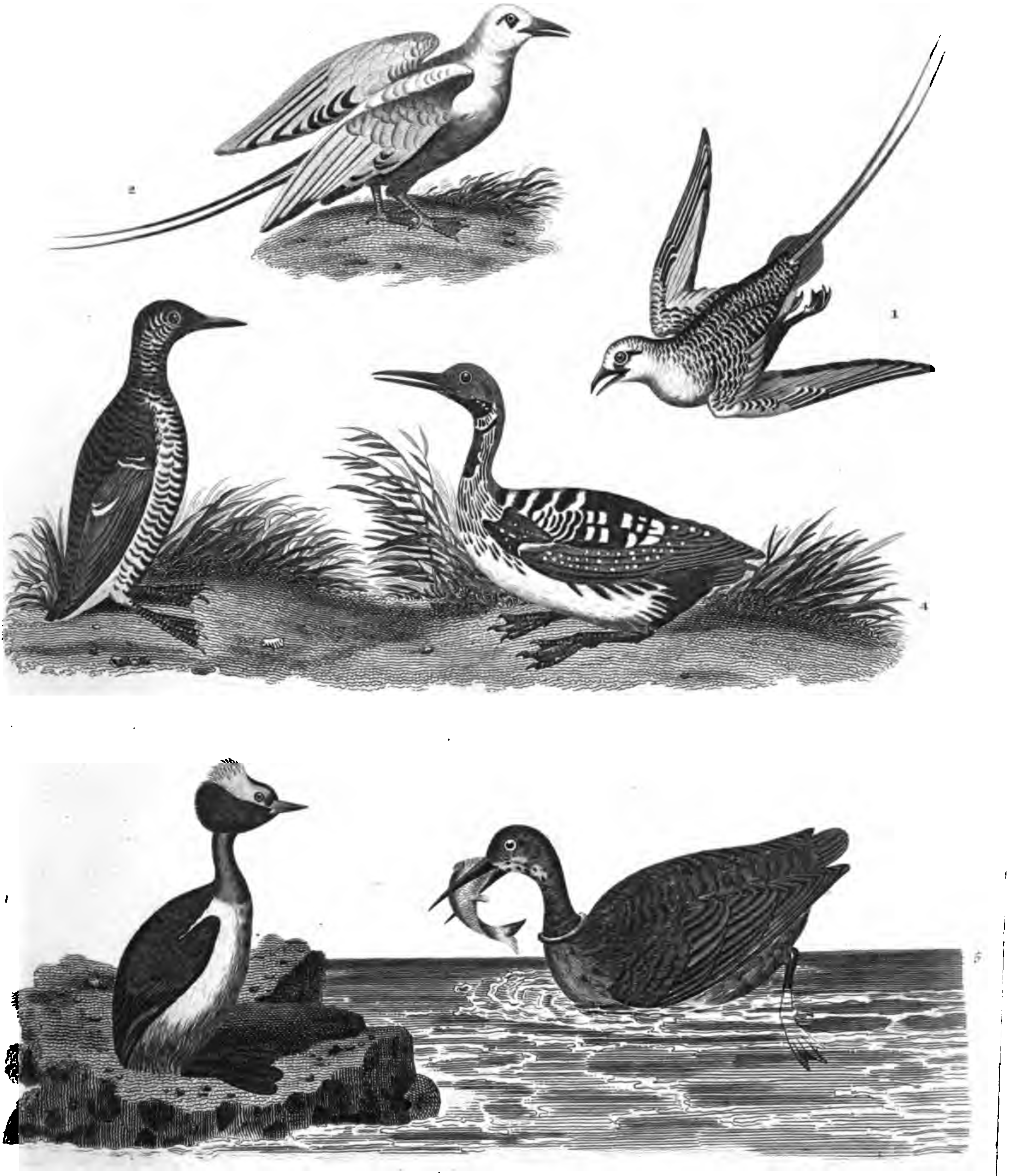
J. Boyd. Sc.

GENUS GRACULA (Grakle)	G PARADISEA (Bird of Paradise)	G TODUS (Tody)

1. G. *Quiscala*. PURPLE G.
2. G. *Calva*. BALD G.
3. G. *Saularis*. DIAL G.
4. P. *Regia*. KING BIRD of P.
5. P. *Apoda*. GREATER BIRD of P.
6. P. *Aurea*. GOLDEN BIRD of P.
7. T. *Macrorhynchos*. GREAT BILLED T.

ORNITHOLOGY

Linn Syſt. Div. 2. Water Birds Order 3d. ANSERES. *PLATE 2.*



G. PHAETON
(Tropic Bird)

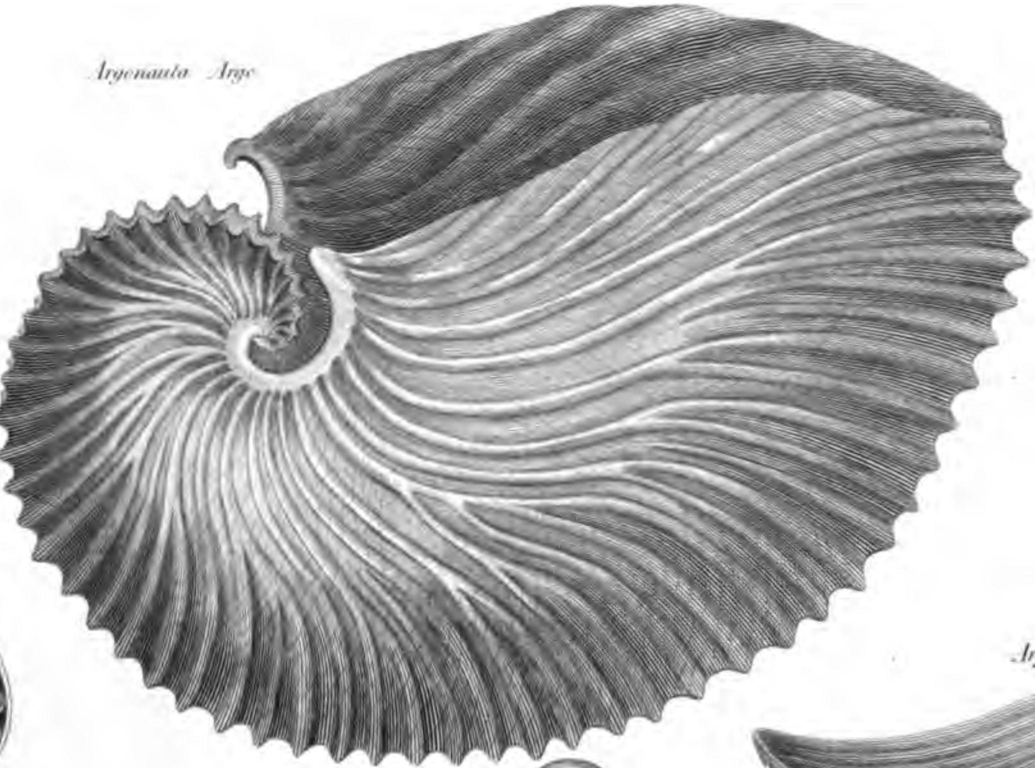
GENUS COLYMBUS
(Guillemot. Diver. Grebe.)

1. P. *Æthereus*	2. P. *Phœnicurus*	3. C. *Marmoratus*	4. C. *Arcticus*	5. C. *Sinensis*	6. C. *Cornutus*
COMMON T.	RED TAILED T.	MARBLED G.r	BLACK-THROATED D.	CHINESE D.	HORNED G.r

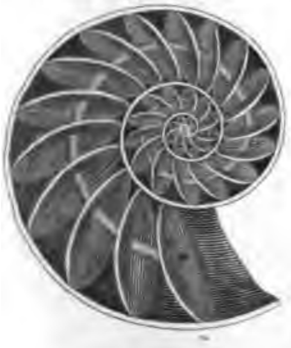
CONCHOLOGY

Order Univalve Genus Argonauta _ G Nautilus.

Argonauta Argo

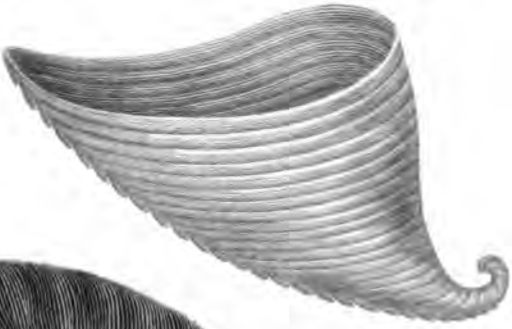


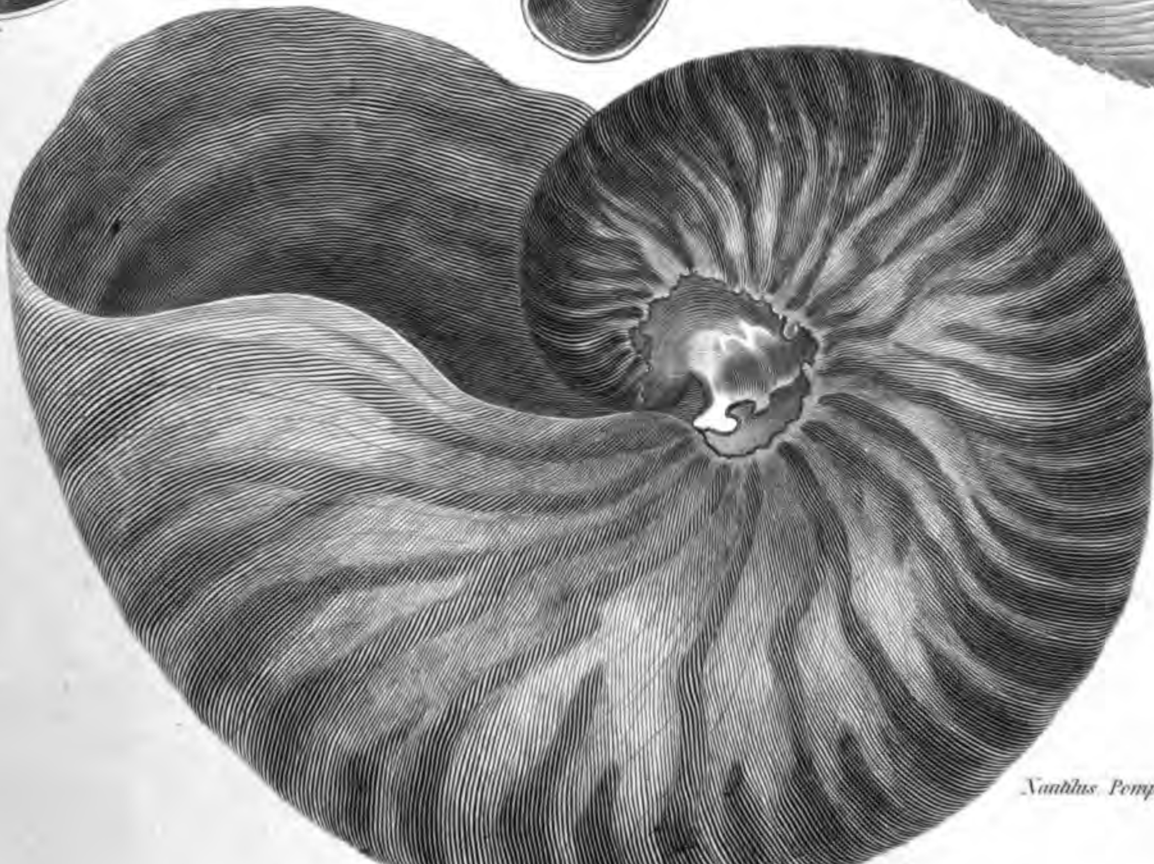
Section of Nautilus



Nautilus Pompilius

Argonauta Vitreus





Nautilus Pompilius

H. Hecker, sc.

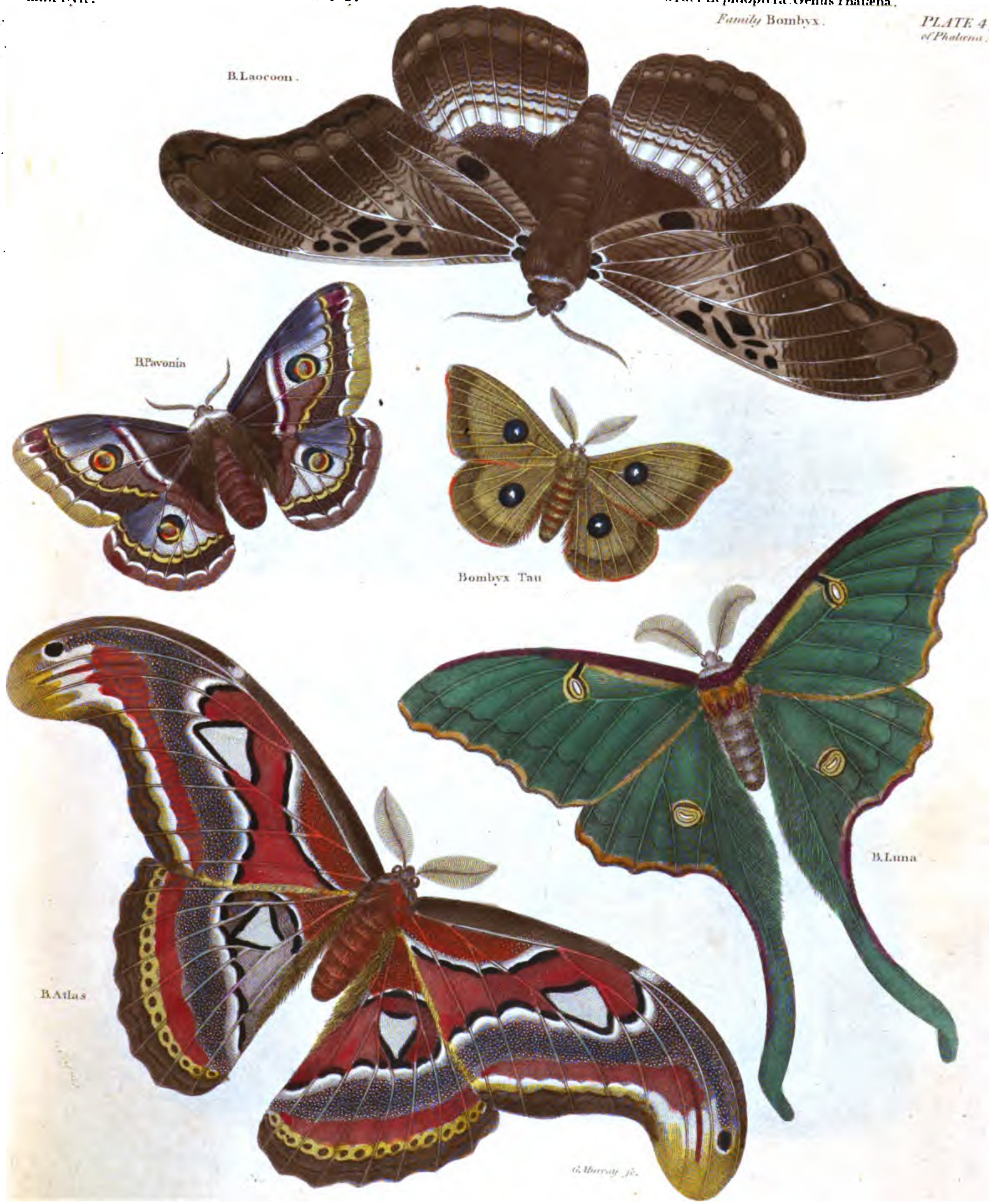
Linn Syſt.

ENTOMOLOGY.

Order Lepidoptera. Genus Phalæna.

Family Bombyx.

PLATE 4, *of Phalæna.*

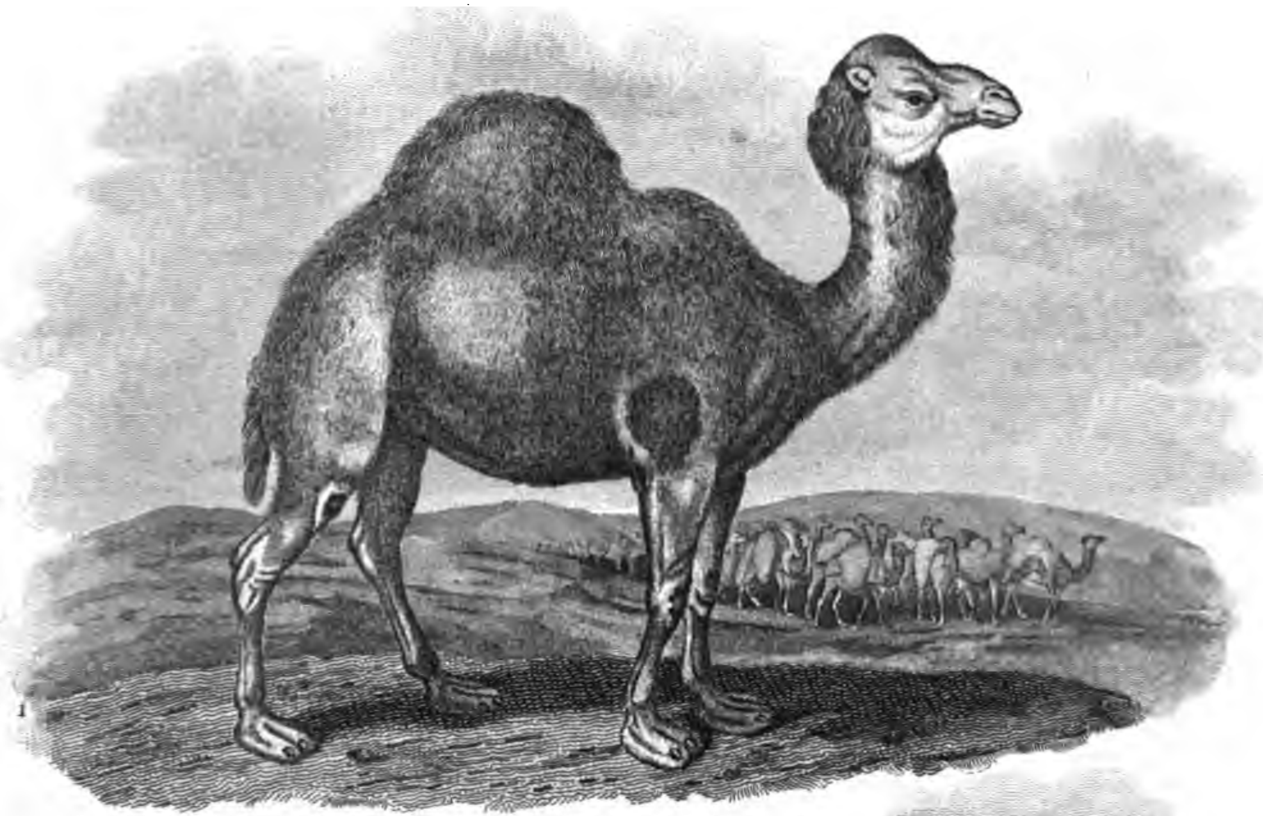


Linn. Syſt.

QUADRUPEDS.

PLATE 5.

MAMMALIA ORDER. PECORA GENUS. CAMELUS.



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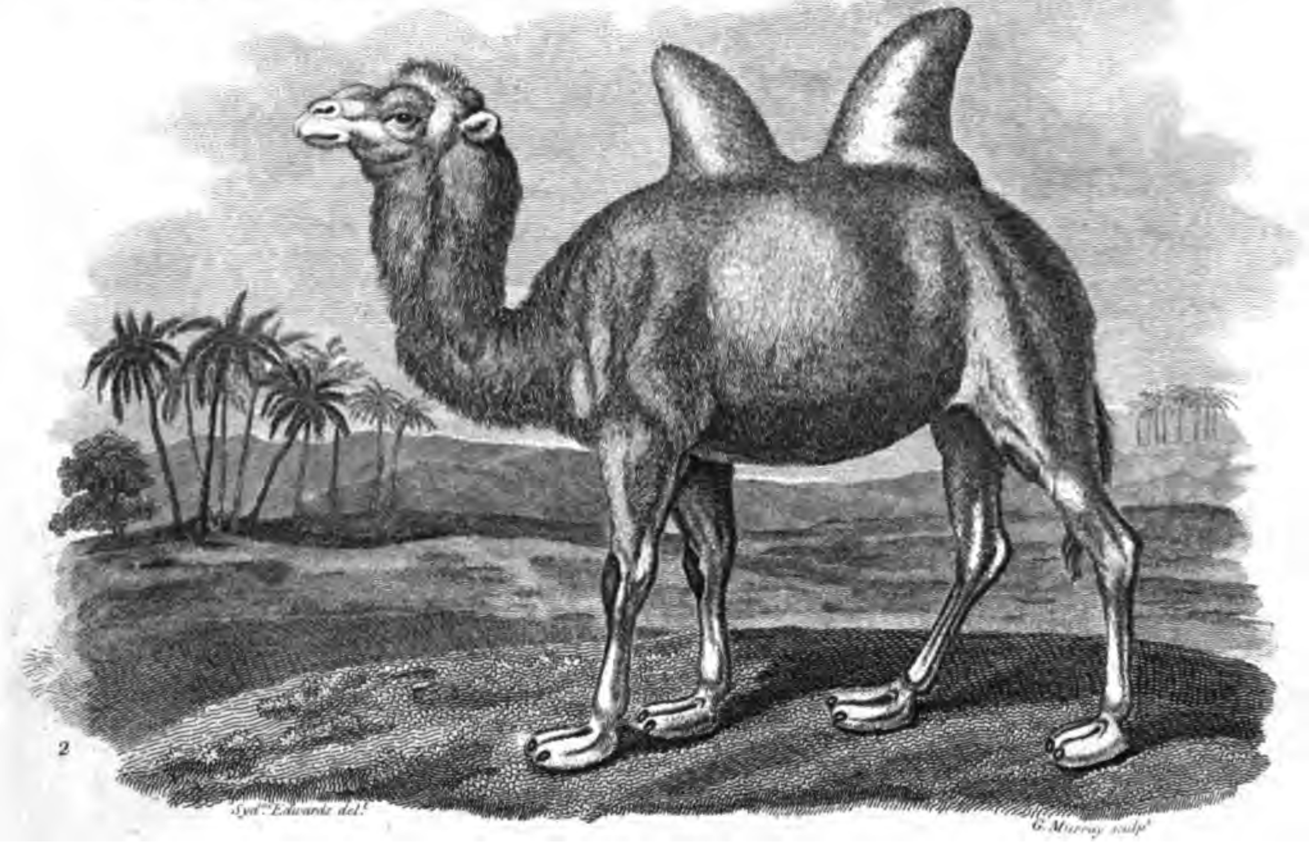


2

Syd^m Edwards del^t

G. Murray sculp^t

1. Camelus Dromedarius. Arabian Camel or Dromedary.

2. Camelus Bactrianus. Bactrian Camel.

been considered by Linnæus and some others as a species of Oriolus. Its general length, from the tip of the bill to that of the tail, is from eight to ten inches, and its colour, except on the throat, the edges of the wings, and the tail, all which are jet black, is a rich golden yellow, heightening on the upper parts into bright saffron colour; the bill is surrounded at the base by velvet-like feathers of a blackish colour. The tail is even at the end, and slightly tipped with yellow. It is supposed to inhabit the same regions as the rest of the genus, though but little is known of its history or habits.

Fig. 7. *Tody.* (*Todus Macrorhynchos*, Linn. *Platyrhynchos Rostratus*, Cuv.)

This bird is of the size of a Nightingale. The bill broad, and of a blackish colour, with whitish edges and tip; colour of the plumage glossy blue-black, with the abdomen fine purple-crimson, and a bar or crescent of the same colour beneath the throat; the edge of the alulet or spurious wing, at the shoulders, pale orange; and the scapular feathers, to the number of six or seven, white, lanceolate, and spreading over the coverts; legs black; middle and outer toes connected.

PLATE II.—ORNITHOLOGY.

Fig. 1. *Common Tropic Bird.* (*Phæton ætherius*, Linn.)

This bird is almost entirely white, excepting the two middle tail-feathers, which are black at the base; the bill is red. It is the size of a wigeon, flies very high, and far from land. It feeds on young sharks, dolphins, and albicores. On land, where it is rarely seen except in the breeding season, it alights on trees, and builds on the ground in forests. It is well known to navigators, announcing their approach to the tropic, although the indication is not infallible.

It inhabits the South Sea, especially between the tropics.

Fig. 2. *Red-tailed Tropic Bird.* (*Phæton phœnicurus*, Linn.)

This bird is of a rosy flesh colour, the bill and two middle tail-feathers being red. It is about thirty-four inches long, of which the two middle tail-feathers measure twenty-one inches. It is found in the island of Mauritius, building in hollows in the ground; it lays two yellowish-white eggs, with rufous spots.

Fig. 3. *Marbled Grebe.* (*Uria grylle, var. marmorata*, Cuv. *Colymbus marmoratus*, Linn.)

This bird is a general inhabitant of Europe and America, frequenting the sea-coast, and preying on fish; it builds its nest on the ground, and lays whitish eggs with black spots.

Fig. 4. *Black-throated Diver.* (*Colymbus arcticus*, Linn. and Cuv.)

This bird attains a length of two feet, and inhabits the northern regions of Europe, Asia, and America. Its head is of a hoary whiteness; its neck, of a violet colour, with an interrupted white band.

Fig. 5. *Chinese Diver.* (*Colymbus sinensis*, Gmel.)

Colour, greenish-brown with deeper spots; breast and belly reddish-white, spotted and rufous; wings and tail blackish.

It inhabits China, and is supposed to be trained by the Chinese for the purpose of catching fish.

Fig. 6. *Horned Grebe.* (*Colymbus cornutus*, Linn. and Cuv. *Colymbus caspicus*, Veil.)

Head smooth; body above, dark brown; beneath, silvery; bill, lead-colour; chin and cheeks, white. It inhabits near the Caspian sea.

PLATE III.—CONCHOLOGY.

Upper figure. *Paper Nautilus.* (*Argonauta argo*, Linn. and Lam.)

This beautiful shell is a native of the Mediterranean and Indian seas, and is supposed to have taught mankind the use of sails, and the art of navigation. When it wishes to make its way over the surface of the sea, it discharges a quantity of water, by which its specific gravity is made less than that of its native element; and rising consequently to the surface, erects its arms and expands a membrane between them, by means of which it is driven by the wind like a vessel under sail. When a storm arises, it takes in a sufficient quantity of sea-water, and immediately descends to the bottom.

Right-hand figure. (*Argonauta vitrea*, Linn. *Carinaria vitrea*, Lam.)

Inhabits the Indian ocean.—The three remaining figures represent the *Nautilus pompilius*, (Linn. Lam.) the most common species of this genus, and contained in all collections of shells. It is very large, formed internally of a beautiful nacre, and marked externally by fawn-coloured bands on a white ground. It inhabits the Indian seas.

PLATE IV.—ENTOMOLOGY.

This plate represents five species of the Bombyx tribe. These insects never fly except at night, secreting themselves during the day beneath the leaves or branches of trees, where they remain until sunset, when they spread their wings with great activity.

Fig. 1. *Bombyx Laocoon*, Linn. *Saturnia Laocoon*, Lat. Inhabits Africa.

Fig. 2. *Bombyx pavonia*, Linn. *Saturnia pavonia*, Lat. Inhabits Europe.

Fig. 3. *Bombyx tau*, Linn. *Saturnia tau*, Lat. Inhabits Europe.

Fig. 4. *Bombyx luna*, Linn. *Saturnia luna*, Lat. Inhabits the United States.

Fig. 5. *Bombyx atlas*, Linn. *Saturnia atlas*, Lat. Inhabits China.

PLATE V.—QUADRUPEDS.

Fig. 1. *Arabian Camel.* (*Camelus dromedarius*, Linn. Cuv.)

This species of camel has but one bunch on his back, and is about six feet and a half high. The head is small, the neck long, and the body of a meagre unsightly form; the legs are slender, and the feet are divided above into two lobes not reaching through the whole length of the foot, and the extremity of each lobe is guarded by a small hoof; the under skin of the foot is strong, tough, and pliable, enabling the animal to travel with peculiar ease over hot, stony, and sandy tracts.

The Camel is venerated by the Arabs as the gift of heaven, as a sacred animal, without whose aid they could neither trade nor travel, nor even subsist. Blest with their camels, they not only want nothing, but fear nothing. In a single day they can traverse a tract of fifty leagues through the desert, and bear their riders beyond the reach of their enemies. Figure to yourself, says Buffon, a country without verdure and without water, a burning sun, an air always clear, plains of sand, and mountains still more parched, over which the eye extends without perceiving a single animated being; a dead earth perpetually tossed by the winds; presenting nothing but bones, scattered flints, rocks perpendicular or overthrown; a naked desert where the traveller never breathes under a friendly shade, where nothing accompanies him, and where nothing recalls to mind the idea of animated nature; an absolute solitude, infinitely more fearful than that of the deepest forest;

more solitary and naked, more lost in an unbounded void, he everywhere beholds the extended space around him as a tomb; the light of the day, more dismal than the darkness of the night, serves only to give him a clearer idea of his own wretchedness, by extending around him the immense abyss which separates him from the habitable parts of the earth. The Arab, nevertheless, by the assistance of his camel, has learned to surmount these frightful intervals of nature, and even to appropriate them to himself. They serve him for an asylum, they secure his repose, and maintain his independence.

Throughout Turkey, Persia, Egypt, Arabia, Barbary, and various other contiguous countries, all kinds of merchandise are carried by camels, which of all conveyances is the most expeditious, and attended with the least expense. Merchants and other travellers assemble, and unite in caravans to avoid the insults and robberies of the Arabs. These caravans are often numerous, and are always composed of more camels than men. Each camel is loaded according to his strength, and when overloaded, he refuses to proceed, remaining in his resting posture till his burden is lightened. Large camels generally carry from a thousand to twelve hundred pounds weight, and the smallest from six to seven hundred. In these commercial travels, their march is not hastened; as their route is often seven or eight hundred leagues, their motions and journeys are regulated; they walk only, proceeding at the average rate of ten or twelve leagues a day. Camels that form a part of these mercantile caravans, unlike those of the predatory Arabs, it is affirmed, are relieved from their load every night, and allowed to feed at liberty; and in a country where they find abundant pasture, they eat in one hour sufficient to ruminate for a whole night, and to nourish them for twenty-four hours. But it is seldom they meet with such pasturage, neither is this delicate food necessary for them. They even seem to prefer wormwood, thistles, nettles, furze, and other prickly and thorny vegetables, to the softest herbs; and so long as they can find herbage, they can easily dispense with drink. With qualities of such general utility in passing over the dreary regions of the deserts, these valuable animals possess no ordinary share of sagacity. They are said, indeed, to be extremely sensible of injustice and ill treatment. The Arabs assert, that if a person strike them without cause, he will not find it easy to escape their vengeance, and that they will retain the remembrance of it till an opportunity offers for gratifying their revenge, having in this point a striking similarity of character with their Arab masters. It is said that in these fits of rage they sometimes take up a man in their teeth, throw him on the ground, and trample him under their feet.

The facility with which the camels abstain from drink in their journeys over the burning deserts, is more remarkable than their abstinence from food; it is so extraordinary, that, according to Leo Africanus, they are capable of remaining without drink fifteen days without prejudice to their health; but after long abstinence, it is said, they are apt, on their first meeting with water, to drink so greedily that it proves suddenly fatal to many of them. This facility does not proceed from habit alone, but is rather, as Buffon observes, the effect of their structure. Independently of their four stomachs, which are common to ruminating animals, the camel is possessed of a bag, which serves him for a reservoir to retain water. This fifth stomach is peculiar to the camel; it is so large as to contain a great quantity of water, where it remains without corrupting, or intermixing with other aliments. When the animal is oppressed by thirst, or has occasion for water to masticate his dry food in ruminating, he causes part of the water to ascend into his stomach, or even so high as the throat, by the mere contraction of certain muscles.

It is by virtue of this conformation that the camel is enabled to pass several days without drinking, and to take at any one time a prodigious quantity of water, which remains in the reservoir pure and limpid, because neither the liquors of the body nor the juices of digestion can mix with it. There can be no doubt that the water preserved by the camel in this receptacle remains perfectly pure, all writers agreeing in this particular. It is no very uncommon circumstance, in passing through the deserts, for travellers to kill a camel in order to obtain a supply of water from this receptacle when they are destitute of this necessary article, and cannot procure it in any other manner. The loss of a camel, on such an occasion, is of the less consideration, as the flesh affords the traveller and Arabs a rich repast, independent of the advantage of being supplied with water. Instances of this occur in Bruce's travels to discover the source of the Nile, and various others.

The camel that carries Mahomet's standard, which the caravan of pilgrims offer yearly on the tomb of their prophet, is exempted the rest of its life from all services. It is even pretended that this happy beast will rise again at the general resurrection, and enjoy the pleasures of Paradise.

There are several varieties of this kind of camel, differing in size, strength, colour, and other slight particulars, as in our different breeds of horses, and other domesticated animals; and there are also hybrid varieties produced between this and the following species. It should be further stated, to prevent confusion, that the dromedary of Gesner is not the same animal as Jonston describes in his history of quadrupeds by that name; the latter means the Bactrian or two-bunched camel. Knorr follows this writer, calling the Bactrian camel Dromedar, Tranpelthier, order Dromedar; but this, as already shown, is not the true dromedary. Forshal distinguishes the Arabian camel, our present species, and the dromedary of modern authors, by the title of Camelus vulgaris. It is Camelus of Jonston, and Camelus dromus of Gesner.—See ***Rees's Cyclop. Volney's Trav.***

FIG. 2. *Bactrian Camel.* (*Camelus bactrianus*, LINN. CUV.)

Pallas calls this species the Taurian Camel; and it is at first sight distinguished from the former by having two bunches on its back.

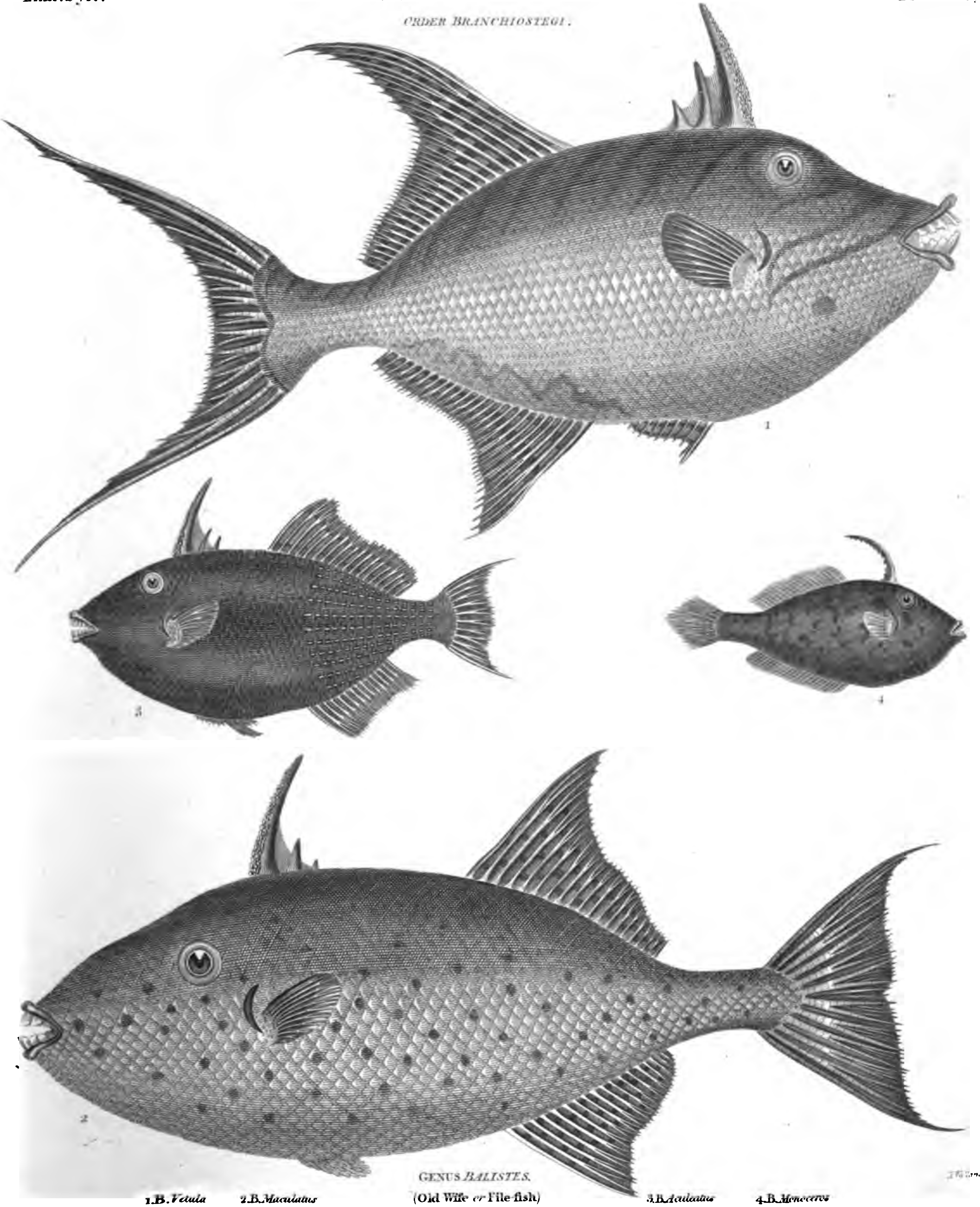
In the peninsula of Crimea they attain a larger size than among the Kalmuc Tartars. Sonnini asserts that they do not inhabit Egypt, which has the Arabian camel only. This is the camel which authors mention as still existing in a state of nature in the deserts of the temperate parts of Asia, more especially in those between China and India, and which is reported to be larger than the domesticated race. The Arabian camels are beyond comparison more numerous and universal than this species, which requires a more temperate climate and a moister soil than the former. From Pallas it may be seen that the Bactrian camel is much more common in various parts of Russia than is generally supposed. They rarely employ this creature as a beast of burden, but train it for the saddle, and for drawing wagons, as a substitute for horses. It thrives best in the milder parts of Tartary; but it bears even the severity of a Siberian climate, being found in the vicinity of Lake Baïkal, where the Mougols and Burats keep them in great numbers. Here they are said to live during the winter on willows and other trees, a diet affording little nourishment, in consequence of which they become lean and meagre towards the close of winter. They thrive best in dry grounds and the salt marshes. A variety of this camel is cultivated in China, and remarkable for its fleetness, whence it bears the expressive name of ***Fong Kyo Fo***, camel with the feet of wind.

PLATE VI.—ICHTHYOLOGY.

These four species of the genus BALISTES, (Linn.) known by the familiar name of *Old Wife*, abound in the torrid zone, near rocks and on the surface of the water, where they display their brilliant colours. Their flesh, which is lightly esteemed,

Linn. Syſt. **ICHTHYOLOGY.** *PLATE 6.*

ORDER BRANCHIOSTEGI.



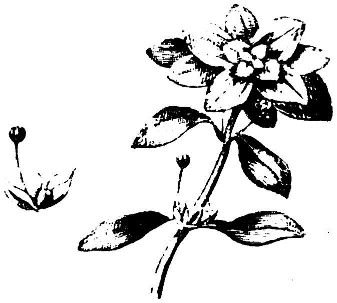
GENUS *BALISTES.*

(Old Wife *or* File-fish)

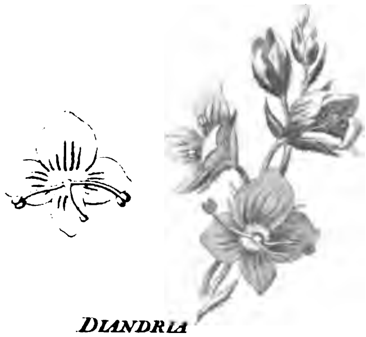
1. B. *Vetula* — *OLD WIFE*
2. B. *Maculatus* — *SPOTTED O.W.*
3. B. *Aculeatus* — *ACULEATED O.W.*
4. B. *Monoceros* — *ONE HORNED O.W.*

BOTANY.

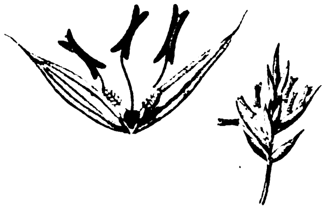
Classes.



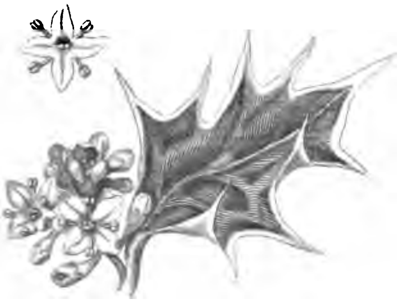
MONANDRIA



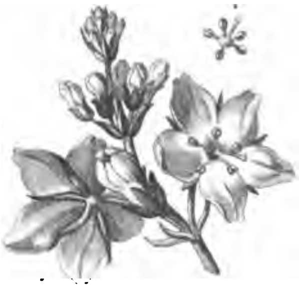
DIANDRIA



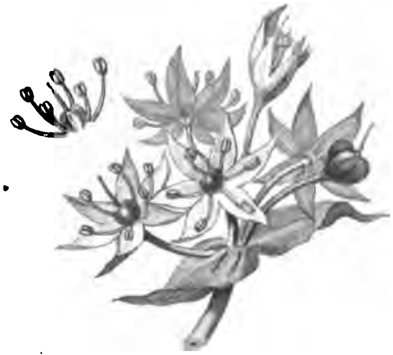
TRIANDRIA



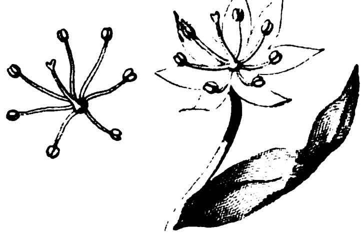
TETRANDRIA



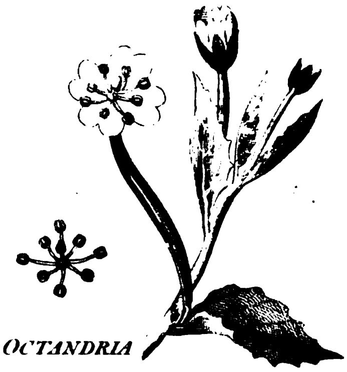
PENTANDRIA



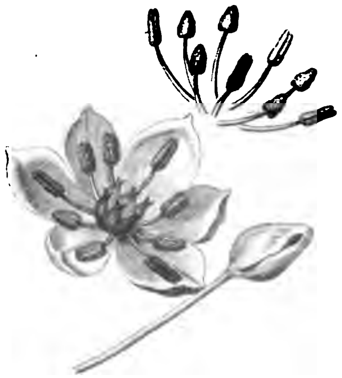
HEXANDRIA



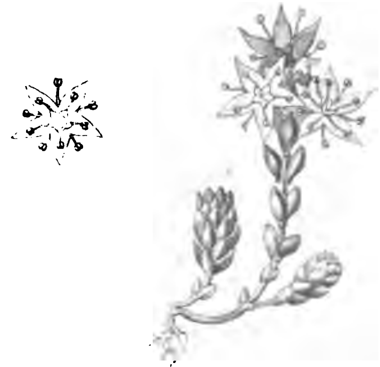
HEPTANDRIA



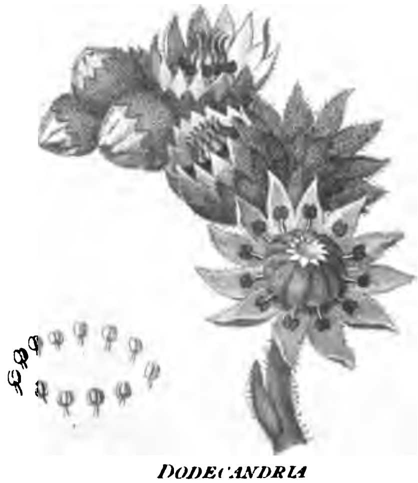
OCTANDRIA



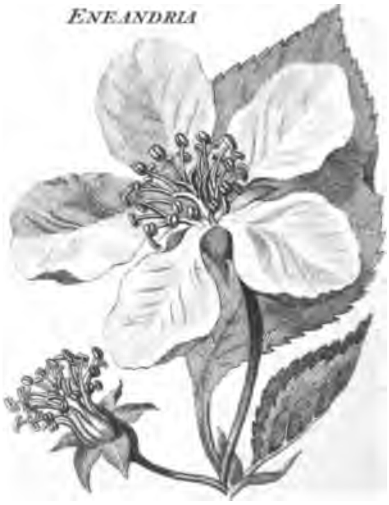
ENEANDRIA



DECANDRIA



DODECANDRIA

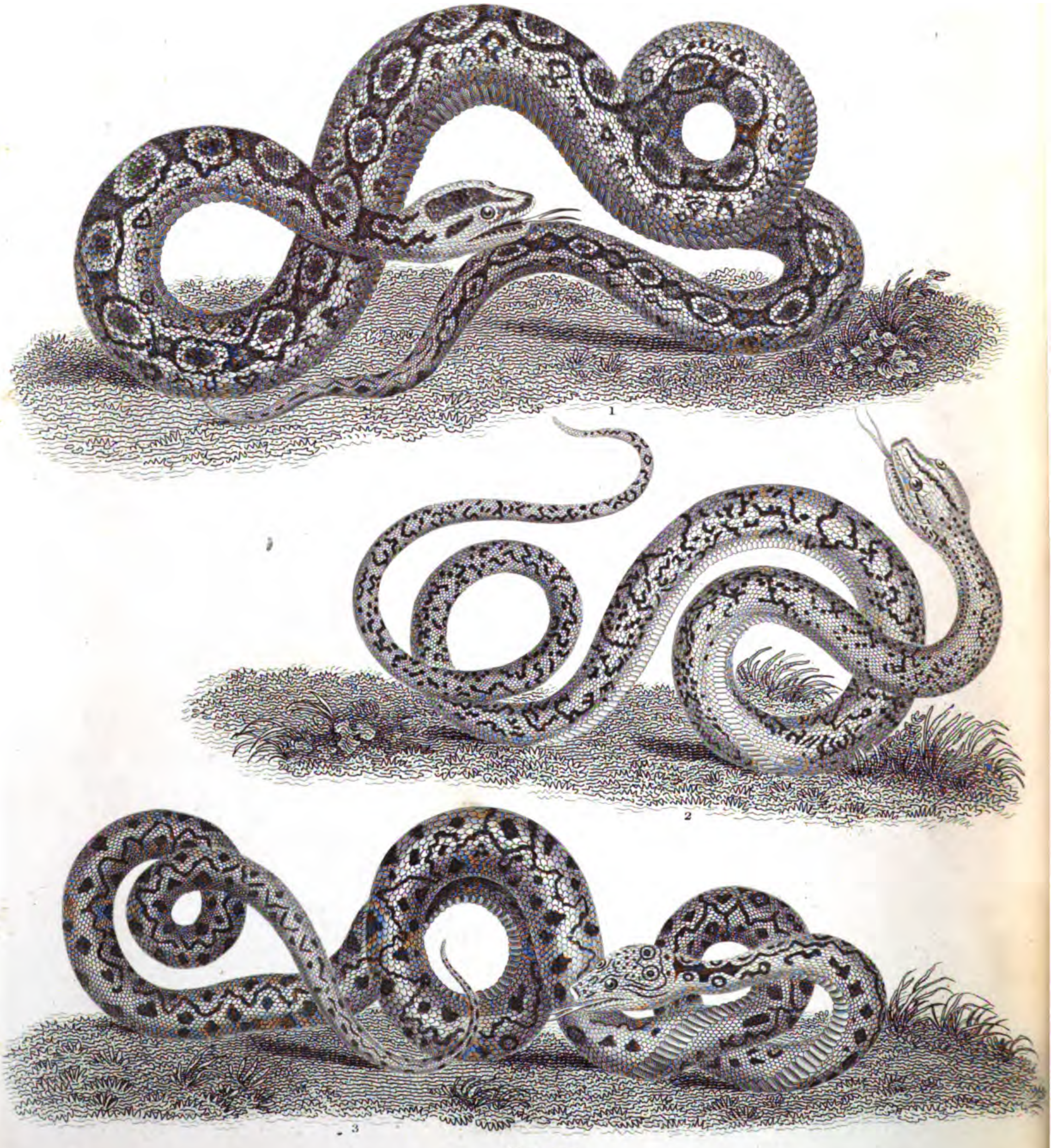


ICOSANDRIA

Linn. Syſt. **PLATE 8.**

AMPHIBIA.

GENUS _ *BOA*.



(Serpent)

1. B. *Constrictor.* 2. B. *Phrygia* 3. B. *Hortulana*

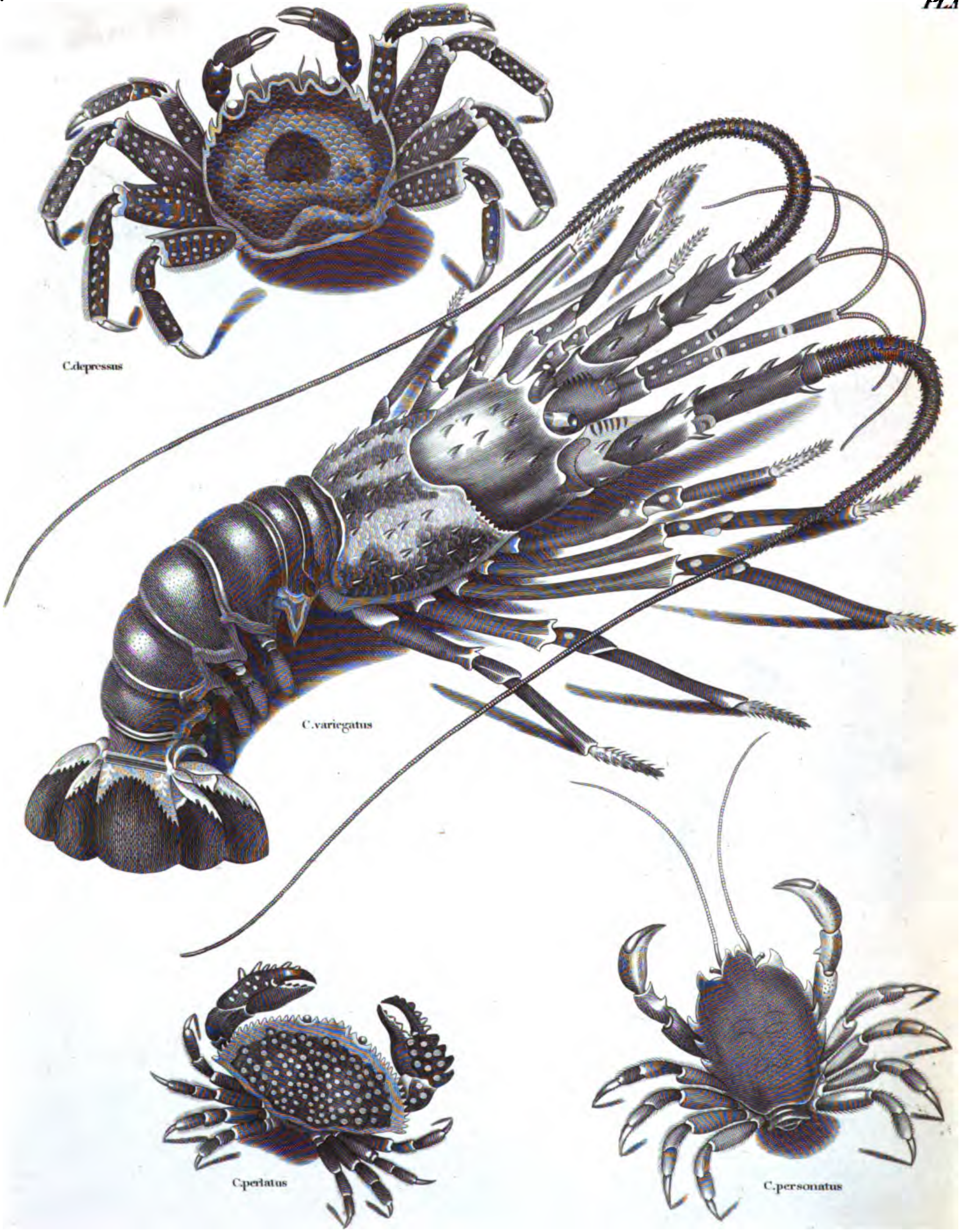
GREAT B. EMBROIDERED B. GARDEN B.

Linn Syſt

CRUSTACEA.

GENUS CANCER.

PLATE 9.



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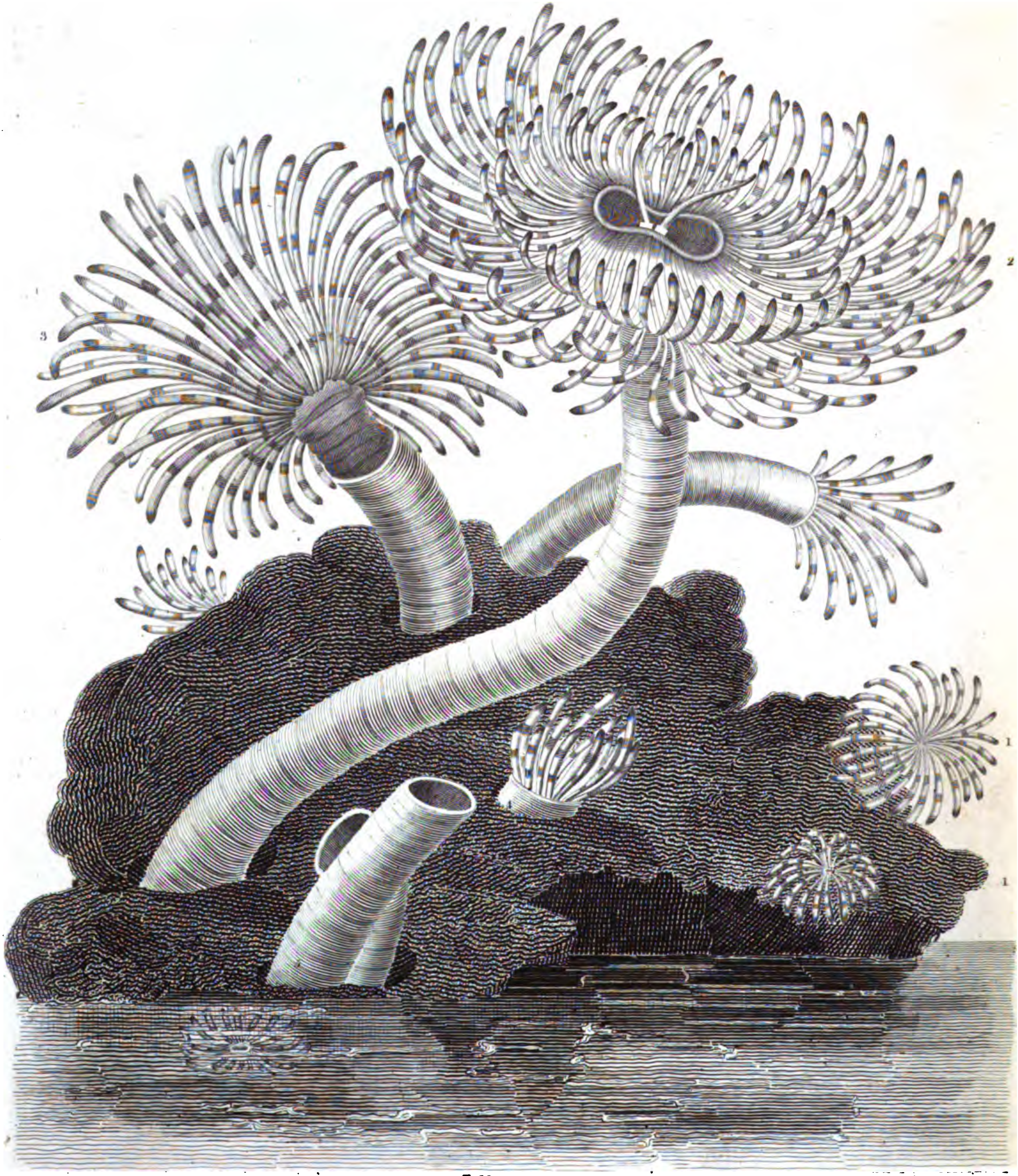
Linn Syst. VERMES. PLATE 10.

Order Zoophytes.

GENUS TUBULARIA.



T. MAGNIFICA.

(Magnificent Tubularia.)

H S Tanner Sc

1.1 *The Animal in its young state - 2. full grown (front view) expanding its tentacula - 3. back view - 4. partially retracted - 5. entirely retracted.*

is said to become poisonous during the season when they feed on the Coralline Polypi.

Fig. 1. *Old Wife.* (*Balistes vatula*, Linn. Cuv.)

Fig. 2. *Spotted Old Wife.* (*Balistes maculatus*, Linn. Cuv.)

Fig. 3. *Aculeated Old Wife.* (*Balistes aculeatus*, Linn. Cuv.)

Fig. 4. *One-horned Old Wife.* (*Balistes monoceros*, Linn. *Aluteres monoceros*, Cuv.)

PLATE VII.—BOTANY.

This plate illustrates twelve of the twenty-four classes into which Linnæus arranged his whole botanical system. In these twelve classes the stamina have no determinate proportion to each other as to length.

First Class, Monandria, has one stamen.
Second Class, Diandria, has two stamina.
Third Class, Triandria, has three stamina.
Fourth Class, Tretrandria, has four stamina.
Fifth Class, Pentandria, has five stamina.
Sixth Class, Hexandria, has six stamina.
Seventh Class, Heptandria, has seven stamina.
Eighth Class, Octandria, has eight stamina.
Ninth Class, Enneandria, has nine stamina.
Tenth Class, Decandria, has ten stamina.
Eleventh Class, Dodecandria, has eleven stamina.
Twelfth Class, Icosandria, has twenty or more stamina inserted into the calyx.

The remainder of the Linnæan classes will be given in a future page, when it is proposed to embrace the names of the *orders*, and the number of the *genera*, which Linnæus appropriated to each class.

PLATE VIII.—AMPHIBIA.

The genus Boa is remarkable for the vast and almost unlimited size of some of the principal species, which in India, Africa, and South America, are occasionally found of not less than twenty, thirty, and even thirty-five feet in length, and of a strength so prodigious as to be able to destroy cattle, deer, and other animals, by twisting around them in such a manner as to crush them by continued pressure; after which they swallow them in a very gradual manner; and when thus gorged with their prey, become almost torpid with repletion; and if discovered in this state, may without much difficulty be destroyed by shooting or other methods. These snakes are now more rarely met with than formerly.

Fig. 1. *Boa Constrictor*, Linn. and Cuv.

Of all the larger Boæ, the most conspicuous is the *Boa Constrictor*, which is at once pre-eminent from superiority of size and beauty of colours. In this last respect, it is subject to considerable variation from age, sex, and climate, but may be distinguished in every state from the rest of its tribe by the peculiar pattern or disposition of its variegations, which are faithfully delineated in the plate, fig. 1. The Boa Constrictor is a native of Africa, India, the larger Indian islands, and South America, where it chiefly resides in the most retired situations in woody and marshy regions. An individual of this species is said by Livy to have thrown the whole Roman army into dismay.

Fig. 2. *Embroidered Boa.* (*Boa phrygia*, Linn.)

Among the whole serpent tribe it may be doubted whether there exists a species more truly elegant than this. It is rather more than four feet in length, and thick in proportion. The ground colour of the whole animal is white, with a very slight cast of yellowish brown on the back, while along the whole upper part is disposed a continued series of black variegations, so arranged as to bear a striking resemblance to an embroidery in needle-work. It is, according to the accurate Seba, a native of the East Indies. He adds, that it is called by the title of *Gerende*, and that in some places divine honours are paid to it.

Fig. 3. *Garden Boa.* (*Boa Hortulana*, Linn. & Cuv.)

This very elegant serpent, which is of a moderate size, measuring only a few feet in length, and being of a slender form, has obtained its Linnæan title from the singular pattern of the variegations on the head, which are of a blackish brown on a pale feruginous, or yellowish brown, and in some degree represent the form of a parterre in an old-fashioned garden. It is a native of South America. Seba figures what appears to be a variety of this species, of a sea-green colour above, with deep chesnut variegations, and pale yellow beneath, with reddish spots.—See *Shaw's Zoology, Vol. III. Part II. Amphibia.*

PLATE IX.—CRUSTACEA.

Fig. 1. *Cancer depressus*, Linn. *Plagusia depressa*, Cuv.

This species of Crab inhabits South America.

Fig. 2. *Cancer variegatus?* Linn. *Palinurus quadricornis*, Cuv.

This Lobster is common to the seas of southern Europe, especially the Mediterranean, where it sometimes attains a weight of twelve or fourteen pounds. It is also found fossil in Italy.

Fig. 3. *Cancer personatus*, Linn. *Corystes personatus*, Cuv.

Inhabits the coast of France, and has even been found as far south as the Cape of Good Hope.

Fig. 4. *Cancer perlatus*, Linn. Cuv.

PLATE X.—VERMES. (*Order Zoophytes*, Linn.)

Magnificent Tubularia. (*Tubularia magnifica*, Shaw. *Sabella magnifica*, Cuv.)

The Zoophytes, or Plant animals, which the term signifies, are a kind of intermediate body, supposed to partake both of the nature of an animal and a vegetable.

The characters of the Tubularia are, that the animal is vegetating and radiated; the head crested with tentacula, generating small eggs, and that the stem is tubulous, horny, very simple or branched, affixed at the bottom, and the animal thrust out at the apex.

The *Tubularia magnifica* represented, must be considered as by far the largest species of its genus yet discovered. It is found in various parts of the coast of Jamaica, adhering to the rocks. It is very shy, and on being approached instantly recedes within its elastic tube, which on a further alarm also retires into the rock, and specimens can be obtained only by breaking off such parts of the stem as contain them. These being put into tubs of sea-water, may be kept for months in perfect condition. The specific character is thus given by Dr. Shaw in the Linnæan Transactions, Vol. V., where will also be found a coloured drawing of this superb plant. "Tubularia with a simple whitish tube, and very numerous tentacula, variegated with red and white."

It is necessary to observe, continues Dr. Shaw, that, in the form of its body, at least as far as can be judged from the parts represented, it seems to make an approach to the genus Amphitrite.

PLATE XI.—QUADRUPEDS.

FIG. 1. *Dwarf Elephant.* Genus *Sokotyro.*

The existence of this animal has been of late questioned by naturalists. It was introduced to the notice of Europe by a description and figure given in the works of Nieukoffs, from which the present was taken. He pretends to have seen it in the island of Ceylon. The French call it the Dwarf Elephant, but it exhibits no appearance of a proboscis. The less confidence is to be placed in the French writers in classing this uncertain quadruped with the Elephant, since it is obvious they have never seen the animal; and though it is usual to figure it, and we have followed celebrated examples, it is seriously to be apprehended that Nieukoffs has received more credit than he deserves; and we shall not waste space in further description.

FIG. 2. *Elephant.* (*Elephas maximus*, LINN. and CUV.)

The Linnæan character of the genus consists in having no fore teeth in either jaw; elongated tusks in the upper jaw only; proboscis very long and prehensile; the body rather naked. The legs are very large and flat; the body massive; the tail rather short, tufted at its point; with two mammæ.

The Indian Elephant is the largest of all living quadrupeds, the height of his body being about ten feet, and his weight from six to seven thousand pounds. The following is the exact measurement of one belonging to the vizier of Oude:—From the one fore foot to the other, over the shoulders, twenty-two feet ten inches and a half; from the top of the shoulder, in perpendicular height, ten feet six inches; from the top of the head to the ground, twelve feet two inches; from the front of the face to the insertion of the tail, fifteen feet eleven inches. The skin is of a deep ash colour. The tusks do not make their appearance in the young till they reach the third year, and those of the adult female are always less than in the male; these are in general from nine to ten feet in length. The eyes of the Elephant are so small as to be a deformity, but they are lively, sparkling, and intelligent. The diminutive size of these organs may assist in protecting them from injury, amidst the bushes and jungle where they seek food. The thick clumsy legs are terminated by feet divided into five toes, which much resemble distinct hoofs, and are surrounded by a bony process. The teats in the female are two, pectoral, and situated a little way between the fore legs. The elephant is nearly thirty years in arriving at its full size.

There is a peculiarity in the dentition of the elephant, which differs from that of every other quadruped,—the provision which nature has made to enable him to masticate a much larger quantity of food than other animals, and that through a longer series of years. The grinders of sheep and deer are worn out in fifteen years; those of horned cattle in twenty; the grinders of the horse last forty or fifty; while those of the elephant last a hundred years, and when totally worn out are renewed again.

This stupendous animal has been known to man from the earliest ages; and of all the beasts which have been taken into his service, he is pre-eminent for size and amazing strength, as well as for great sagacity and obedience. He is gregarious, associating in herds of from fifty to some hundreds. His native country is Asia, and he is to be found in all the southern countries, namely, Cochin-China, Pegu, Siam, Ava, Hindostan, as well as Ceylon, and about all the larger islands.

Elephants hold undisputed sway in the mighty forests they inhabit; their immense size, united strength, and great swiftness, enabling them to dislodge all intruders on their abodes. The lion and tiger fear their united attacks, and avoid such formidable assailants. Seemingly sensible of the large supply of food they require, they will allow no animal, however peaceable, to browse in their territories, of which they hold exclusive possession; and they can only exist in those extensive woody ranges, or immense plains, where vegetation abounds in all its wild luxuriance.

From the conformation of the legs of the elephant, he has evidently been formed to move on level ground; as he wants the elastic ligament, which in almost all quadrupeds connects the top of the thigh-bone with the pelvis, and that gives the hind legs power to resist the strain which is produced by moving on irregular surfaces. Although the elephant is capable of ascending elevated tracts with heavy weights, yet his action plainly indicates that it is not natural for him to do so.

The elephant is an excellent swimmer, and is capable of crossing the largest Asiatic rivers, swimming very deep, sometimes immersed to the head in the water, which does not at all incommode him, if he can reach the top with his proboscis. The movements of the head are confined to a very limited elevation and bending, as also a slight motion from side to side. To supply the defect of a short neck, nature has furnished him with a proboscis, or trunk, an organ of the most exquisite sensibility, and fitted in an eminent degree for a number of useful purposes, and to supply all his necessities. This surprising organ has commanded the admiration of mankind in all ages of the world; its flexibility and strength, and its extreme sensitiveness, excite our astonishment.

The proboscis is a prolongation of the organ of smell, for there are two canals pierced through its centre, from one end to the other, and nearly separated by a fatty substance, about the third of an inch in thickness. These canals the animal has the power of dilating or contracting at pleasure; and it is with these that he supplies himself with drink, by first filling them with the liquid, and then turning the point into his mouth, and discharging the water, previously drawn up by suction to a certain point, beyond which it cannot pass.

Some idea may be formed of the command the animal possesses over his trunk, when it is known that Cuvier has ascertained, from anatomical dissection, that the muscles of this member, which have the power of distinct action, amount nearly to forty thousand. There is no animal organ at all to be compared to it for perfection, and possessing a mechanism so wonderful, and so completely adapted to its varied uses.

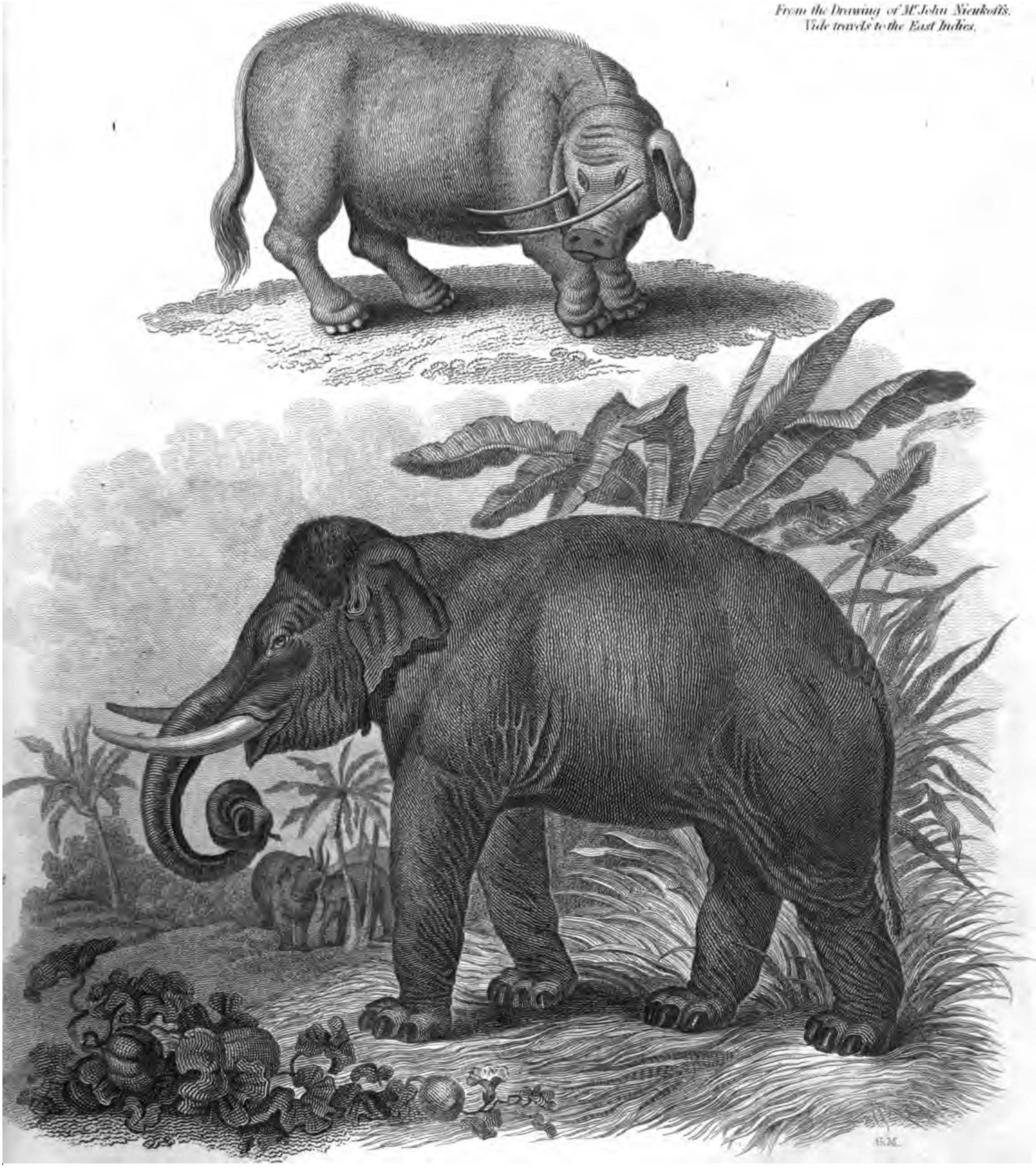
The extreme termination of the trunk consists of a finger-like point, of an exceedingly flexible nature, and with which it can lift from the ground the smallest object, by being pressed against an opposite process; between these two parts, which may be termed the finger and thumb, are situated the nostrils. The first and most essential property of the trunk is, to supply the animal with food; for with it he can despoil the trees of their young shoots and leaves, and crop the herbage of the fields; he twists the point spirally round them, crops them as nicely off as with a knife, and then conveys them to his mouth.

The exquisite sensibility of the trunk, as an organ of touch, next commands our attention. With the finger, he can feel the most minute object, although he cannot see it. Blind elephants can travel in perfect safety, with the assistance of their proboscis, projecting it forward, and with the finger examining all the inequalities of the ground; thus they avoid all the irregularities, and even step over ditches; and they can feed in woods and pastures with nearly as much facility as those who see. If the proboscis is cut through, it becomes useless. He rarely uses it as an offensive weapon, taking the greatest care of it on all occasions. He makes use of it in throwing clods, stones, and other missiles, at his adversaries. His smell is so acute that he will discover a man, or follow a tiger, by this sense alone. Bathing is a favourite recreation with him; in the gardens of the Zoological Society, London, the elephants there exhibited have a large pond expressly for them, where their gambols delight the spectators.

The elephant is a long-lived animal; they have been known to live one hundred and thirty years, and some authors estimate his life at four hundred. The time of gestation is twenty

QUADRUPEDS.

GENUS SUKOTYRO. *GENUS* ELEPHAS. ELEPHANT. *PLATE 11.*


From the Drawing of Mr. John Nieukoff's. Vide travels to the East Indies.

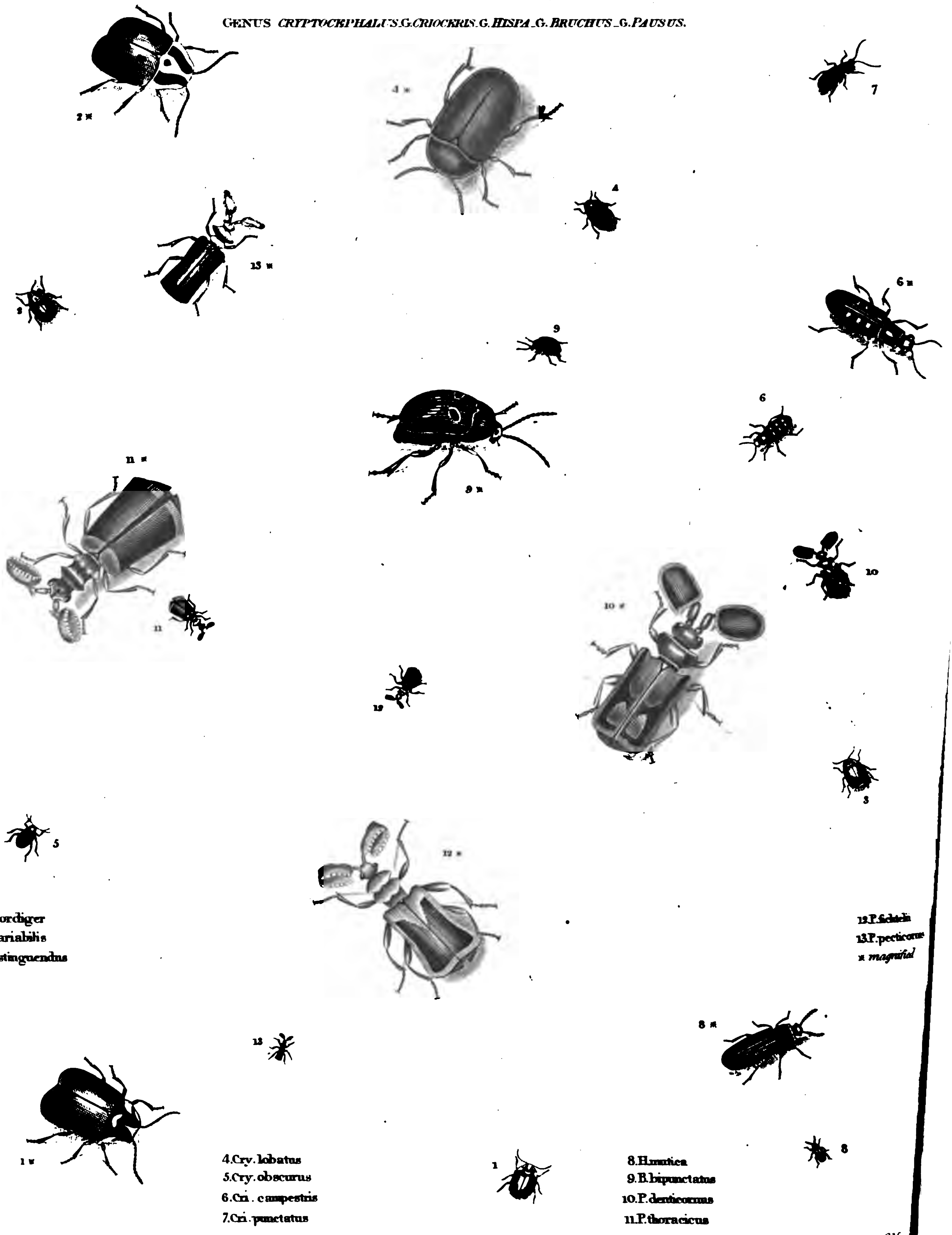
1. Sukotyro Indicus.
Sukotyro.

2. Elephas maximus
Elephant.

ENTOMOLOGY.

Order Coleoptera.

GENUS *CRYPTOCEPHALUS*. G. *CRIOCERIS*. G. *HISPA*. G. *BRUCHUS*. G. *PAUSUS*.



1.Cry. cordiger
2.Cry. variabilis
3.Cry. distinguendus
4.Cry. lobatus
5.Cry. obscurus
6.Cri. campestris
7.Cri. punctatus
8.H. mutica
9.B. bipunctatus
10.P. denticornis
11.P. thoracicus
12.P. fichteli
13.P. pecticornis
x *magnified*

months and eighteen days; they produce but one young at a time, which is, at birth, about thirty-five inches in height; they suck the teats of the mother with their mouth, and not with the trunk, as some authors have asserted. When domesticated, this animal becomes exceedingly docile, and obedient to the commands of his master, for whom he soon conceives an affection, comprehends his signs, understands the sounds of particular words, and regulates his actions according to the expressions of command, of anger, or of approbation. It is computed that an elephant will do the work of six horses; but he requires more food. His daily allowance of rice is 100 pounds, and he is supposed to drink 45 gallons of water.

Did our space admit, we could quote numerous interesting anecdotes of this reasoning animal; the following, however, must suffice. In early times they were employed in India in the launching of vessels. Ludolph mentions one which, upon being commanded to pull a large ship into the water, made an attempt to do so, which, however, proved beyond its strength. The master, in a sarcastic tone, said to the keeper, "Take away that lazy beast, and put another in his stead." The noble animal immediately redoubled his efforts, fractured his skull, and fell dead on the spot.

PLATE XII.—ENTOMOLOGY.

Fig. 1. *Carabus sex-maculatus*, Linn. *Anthia sex-maculata*, Lat.

Fig. 2. *Carabus sycophanta*, Linn. *Calosoma sycophanta*, Lat.

Fig. 3. *Carabus punctatus*, Linn. Lat.

Fig. 4. *Carabus auro-netens*, Linn. Lat.

Fig. 5. *Carabus arenarius*, Linn. *Nebria arenaria*, Lat.

Fig. 6. *Carabus granulatus*, Linn. Lat.

Fig. 7. *Carabus thoracicus*, Linn.

Fig. 8. *Carabus bimaculatus*, Linn. *Brachinus bimaculatus*, Lat.

Fig. 9. *Carabus germanus*, Linn. *Harpalus germanus*, Lat.

Fig. 10. *Carabus prasinus*, Linn. *Anchomenus prasinus*, Lat.

Fig. 11. *Carabus crux-minor*, Linn. *Lebia crux-minor*, Lat.

General Observations on the Structure of Insects.

The structure of insects is altogether a very curious matter, and different from those animal structures with which we are the most familiar. They are all *annulose*, that is, have their bodies divided across into a greater or smaller number of rings, or segments. They are without a spine, or anything like an internal skeleton, and thus the insertion of all the muscles, by which their parts are moved, are on the external covering, which is to them at once both skin and skeleton. We are not acquainted with any surface so perfectly smooth as that of the covering of some insects. It is also the most plastic substance in nature, being of all hues and all consistencies, and adaptable to all purposes, and yet in its composition always the same. It forms the fine down or feathers upon the moth or butterfly, the large nervous wings of the dragon-fly, the sting of the bee, the crust of the beetle; and it is very doubtful whether it does not also form the web of the spider, and even the cocoon of the silk-worm.

The body of an insect was, by Linnæus, regarded as made up of three parts—the head, the trunk, and the abdomen; but as the middle part, or trunk, consists of two distinct portions, more modern naturalists have considered the whole body as made up of four—the head, the thorax, the breast, and the abdomen. The relative proportions of those parts, and also the mode and magnitude of the articulations by which they are jointed to each other, differ much in the different species. The articulation of the head with the thorax can always be determined, and so can the division of the others, if not by the articulation, at least by the *annuli*, or rings. Whatever may be their dimensions, or the mode in which they are joined together, the first ring behind the head is the thorax, the second the breast, and all the remainder, however many rings there may be, the abdomen.

The head, as is the case with other animals, contains the mouth, and the organs of the senses: the only ones of which the functions or the plan are known with certainty, are the eyes, and the *antennæ*, or feelers, which last are conceived to be more properly the organs of touch. The muscles that move the head take their rise near the abdominal extremity of the trunk, and have their insertion within the occipital opening. They are inserted in the direction toward which they move the head, and have their origin at the opposite side of the trunk, so that they cross the trunk inside diagonally; and they produce their motion by contraction, the same as the muscles of quadrupeds. In most instances the muscles that move the head downwards, are more powerful than those that move it in any other direction.

The thorax occupies the first ring of the trunk. It is in some species very small; but generally the centre of the under part of it is formed into a prominent *sternum*, or keel, and the fore legs are articulated to it—one on each side, and the upper part sometimes terminates backwards in a spine, with which the insect is capable of inflicting a wound.

The breast forms the second, and generally the largest, ring of the trunk; but sometimes it and the thorax are so united, that only the depression between the two can be traced; and sometimes they are so loosely articulated, that the breast seems part of the abdomen. The upper part of the breast, which is that in which the principal muscles are inserted, is covered with a shield, or scutellum, of a horny consistency. The imaginary death's-head and cross bones are the bearings upon this shield in the *sphinx atropus*. The under part of this has a sternum, or keel, as well as that of the thorax, to the sides of which the two remaining pairs of legs, the middle and the hind ones, are articulated, and it sometimes covers the articulation and part of the first joint of the legs, and sometimes shields part of the abdomen. The wings are articulated to the breast, at the sides of the scutellum, immediately on the sides of it in those that have not elytra or wing-covers, and in those that have, the wings and wing-covers are articulated to the abdominal edge and angles of the scutellum; so that when the wing-covers are raised, they separate from the scutellum as well as from each other in the middle.

The abdomen occupies the rest of the body. It consists of a greater or smaller number of rings, according to the genus of the insect; and the muscles by which it is moved are inserted in the breast, the same as those that move the head, and they pass diagonally in the same manner. Thus the trunk, and usually the breast, or second ring of the trunk, is the general fulcrum of motion for the whole body.

The wings of insects are worthy of attention, not only from the beauty of their structure, and the nicety with which they are adapted to the other habits of the animal; but as they are very convenient means of classification.

Most winged insects have four wings, though in all, the four are not of similar structure, or equally developed. The wings, which are the proper organs of flight, are constructed of a delicate net-work, of the horny substance which has been alluded to, upon which is spread a thin membrane of the same. Frequently those membranous wings are covered over with feathers, or scales, which also sometimes, as in the sphinx-moths, cover other parts of the insect.

The two upper wings are often horny, and not adapted for flying, but they serve as a protection to the others. These are the elytra; and the insects which have them—beetles, as they are indiscriminately called in common language—are in the habit of creeping into places where membranous wings would be in danger of being torn; or diving in water, where they would be rendered unfit for the purposes of flight. Even the membranous wings of insects, however strong in every thing but the scales with which some of them are covered, are much less liable to injury than one not acquainted with them would be apt to imagine.

Sometimes the upper wings are only half the length, and adhere to the membranous ones that are below; and in many, the two under wings are not developed, but form a slender stalk behind each wing, ending in a knob. These organs are called *halteres*, or balancers. It is doubtful, however, whether these ought, in all cases, to be considered as the rudiments of the second pair of wings, because they have been found wanting in some two-winged insects, and present in some four-winged ones, as in the *Dytiscus marginalis.*

The legs of insects consist of nearly the same distinct parts as those of larger animals. They are—

1. The hip, (*coxa*,) which is immediately articulated to the side of the sternum.
2. The thigh, (*femur*,) which is articulated to the hip.
3. The leg, (*tibia*,) which is articulated to the thigh.
4. The foot, or toe, (*tarsus*,) which consists of several joints, the first of them articulated to the leg, and the last to
5. The claw, (*unguis*,) which terminates the organ.

The form and articulations of these are often exceedingly curious; but we find in them all that perfect harmony of organization and use, which can be so clearly traced in the mechanism of animated nature, and which indeed forces itself upon our notice, whether we attempt to trace it or not. Thus, if the insect has only to walk and not to leap, the thighs are slender; but when it has to leap, they are swelled out in breadth to afford room for the action of the muscles; and the swelling always takes place in that direction which is best calculated for giving ease and force to the motion. The articulation of the femur is equally well adapted to the habits of the insect. In some, the motion is most easy forwards, in others backwards, and in a considerable number it answers equally both ways.

The tibia, too, is made to answer all the purposes of a simple leg; or it is lengthened, feathered, and fringed, that it may serve as an oar; or yet again, it is made compact and firm, and toothed in the edge, so that it may form an engine for digging and cutting.

The tarsus, or foot, varies very much, and exhibits a wonderful deal of mechanical contrivance, and a very nice adaptation of parts to the office that the organ has to perform. There is generally, whatever may be the number of joints or articulations in the part of the limb, a very strong flexor, or contracting muscle, by means of which it is enabled to attach itself firmly to any substance.

The claw is equally varied in its structure. Sometimes, as in the case of the male cricket, it is in the form of a rake, for hewing down and drawing along mud; at other times there are hooked claws, all bending in the same direction, by means of which it can suspend itself; sometimes again the claws act opposite to each other like a hand; and at other times there is but a single claw, to which a little protuberance on the tarsus serves as a thumb.

Such are the outlines of the merely mechanical structure of insects. The other parts are equally curious, even those that are general to the class, and have no reference to the peculiar habits of any one. The nervous system, which is ramified from the brain contained in the head; the singular formation that often is displayed in the mouth, which is at one time a pump, and at another a pair of scissors; the complicated contrivance of cells and tubes, by which the blood is aërated; and above all, the way in which nature has provided for the continuation of the species, with the long probation, and singular changes through which many of them have to pass before they can enjoy the day or the hour which is given to them to wanton in the beams of the sun. Taking them, diversified as they are among the many species and genera, they form, even in one corner of the smallest province of Nature's kingdom, ample and delightful study for the most active mind, through a prolonged life.

We are apt, because we cannot move from one part to another without labour, to associate interest with magnitude; measure power with a line; and reckon wisdom by the tables of chronology; but when the work is His, "with whom a thousand years are as one day, and one day as a thousand years," we find also that space is not an element of the wonderful in His works; or time, of the wisdom with which they have been made.

PLATE XIII.—ORNITHOLOGY.

Fig. 1. *Black and White Fly-catcher.* (*Muscicapa bicolor*, Linn. and Cuv.)

The individuals forming the genus Muscicapa, are amongst the most beautiful of the feathered tribes; they receive their name from their expertness in catching flying insects, upon which they feed; they are found in most countries, and some few feed on fruits; the Fly-catchers are a very numerous family.

The Black and White Fly-catcher has the fore part of the head, orbits of the eyes, fore part of the neck, under parts of the body, bastard wing, and stripe on the greater coverts, white; the rest of the plumage, a few white-tips of the tail-feathers excepted, black. Common in Guiana and Cayenne.

Fig. 2. *Whiskered Fly-catcher.* (*Muscicapa barbata*, Linn. and Cuv.)

The beak of this bird is armed with strong bristles at its base, which are rather larger than the beak itself; the upper parts of the plumage are deep olive-brown, except the crown of the head, which is orange; the under parts are greenish-yellow; the rump nearly yellow; legs brown; length about five inches; the female has the upper parts blackish-brown, tinged with green; the throat and upper part of the neck whitish; the lower part of the latter and breast, brown with yellowish edges; belly and vent yellow; crown of the head with an oblong yellow spot. They build their nests on the naked branches of trees, about one foot in depth and six inches in diameter, with a hole in one side for an entrance. This bird is found in Cayenne; its note is a soft whistle.

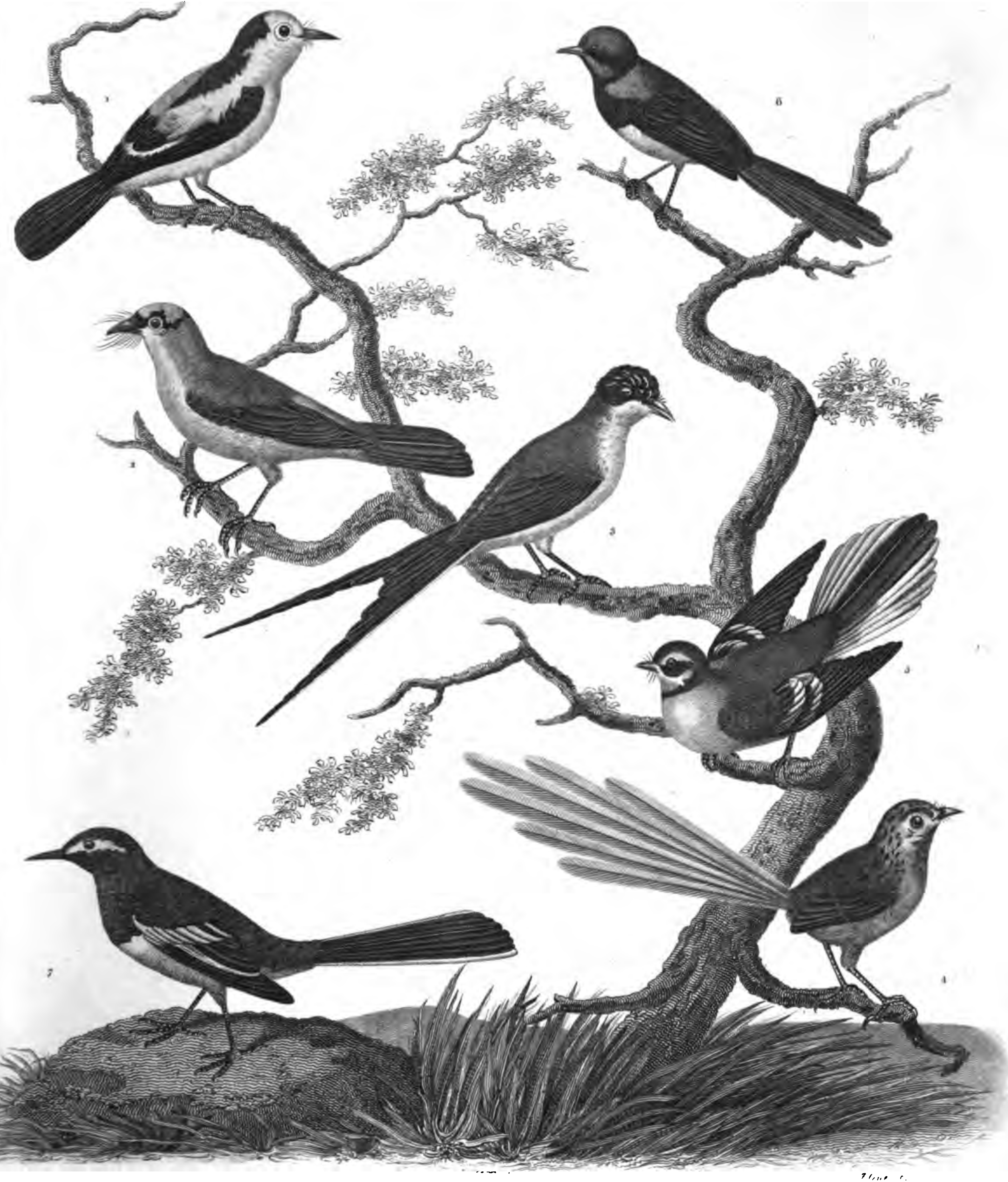
Fig. 3. *Forked-tailed* or *Tyrant Fly-catcher.* (*Muscicapa tyrannus*, Linn. and Cuv.)

About six inches in length; the prevailing colour of its plumage, deep reddish-brown; the wing-coverts brown; the greater ones edged with whitish-olive; ears with a brown spot; chin and breast whitish-gray; lower part of the latter, belly, and vent, yellowish; beak and legs dusky. Inhabits Cayenne.

Fig. 4. *Soft-tailed Fly-catcher.* (*Muscicapa malachura*, Linn. *Malurus malachura*, Cuv.)

This most singular species is thus described by Latham. Length three inches without the feathers; beak brownish-black; base furnished with strong bristles; the plumage mostly ferruginous, streaked with brownish-black, with the middle of the belly nearly white; blue near the beak, and part of the breast of the same colour; the feathers of the rump are long, soft, and silky; wings short; tail four inches or more in length, the shafts very slender and black, the webs on each side consisting of minute slender hairy black filaments, placed at distances, and distinct from each other: the female much like the male in colour. Inhabits New-Holland, in marshy places, Linn Syſt. **ORNITHOLOGY.** *PLATE 13.*

Order PASSERES.



GENUS *MUSCICAPA*

(Fly Catcher)

G. *MOTACILLA*

(Warbler)

1 M *Bicolor*	2 M *Barbata*	3 M *Tyrannus*	4 M *Malachura*	5 M *Flabellifera*	6 Mot. *Cyanea*	7 M *Madraspatensis*
BLACK & WHITE F.C.	WHISKERED F.C.	FORKED TAILED F.C.	SOFT TAILED F.C.	FAN TAILED F.C.	SUPERB WHEAT-EAR	PIED WAG TAIL.

where it hides in the long grass, and builds. When disturbed, its flight is very short, but it runs with great swiftness. It feeds on flies and insects.

FIG. 5. *Fan-tailed Fly-catcher.* (*Muscicapa flavellifera*, LINN. and CUV.)

Length of this beautiful species, six inches and a half; beak black, and furnished with bristles at the base; head black, with a narrow collar of the same round the throat; the chin, throat, and sides of the neck, except this collar, white; and over the eyes, a white streak like an eye-brow; upper parts of the body olive-brown, and some of the wing-coverts tipped with white; the tail is longer than the body, and cuneiform; the two middle feathers black, the others white; the legs dusky.

It is very familiar, and will sit on a person's shoulder and pick the flies off. It always flies with its tail spread, and is continually on the wing in pursuit of insects. It has no song, but only a sort of chirp.

FIG. 6. *Superb Wheat-ear.* (*Motacilla cyanea*, LINN. *Saxicola cyanea*, CUV.)

The prevailing colour of this bird's plumage is deep blue on the upper parts, and white on the under; the sides of the neck are black. It inhabits the country between the rivers Onon and Argun, in Danuria, in the spring, but is by no means common.

FIG. 7. *Pied Wagtail.* (*Motacilla madraspatensis*, LINN. and CUV.)

The Pied Wagtail has the beak, head, neck, breast, and upper parts of the body, black; the under parts, and an oblique bar on the wings, white; the middle tail feathers black, and the lateral ones white; the female has those parts grey that are black in the male. Inhabits Madras.

REMARKS.

In the course of the present publication, the periodical nature of it considered, and the variety of subjects to be investigated, some transpositions, &c. and even repetitions, will occasionally take place, and it will be necessary to look upon it at its conclusion, as a whole, and not to view it when completed in its single parts. The Index at the end of each volume will refer to the several subjects and remarks, in such a manner as to connect the whole, and make it accessible. Had any other than a periodical form been adopted, each division and subject could have been dismissed at once. The present space affords us an opportunity to insert thus early some ***Remarks on Birds in general***, which will render our former and ensuing descriptions intelligible.

In Birds, says Shaw, to whom we are often indebted, the skeleton or bony frame is, in general, of a lighter nature than in quadrupeds, and is calculated for the power of flight; the spine or backbone is immovable, but the neck lengthened or flexible; the breast-bone very large, with a prominent keel down the middle, and formed for the attachment of very strong muscles; the bones of the wings are analogous to those of the fore legs in quadrupeds, but the termination is in three joints or fingers only, of which the exterior one is very short. What are commonly called the legs, are analogous to the hind legs in quadrupeds, and they terminate, in general, in four toes, three of which are commonly directed forwards, and one backwards; but in some birds there are only two toes, and in some only three. All the bones in birds are much lighter, or furnished with a larger cavity, than in quadrupeds.

With respect to the definition of a bird, as absolutely distinguished from all other animals, it would be sufficient to say, according to the old mode, that a bird is a two-footed, feathered animal. The power of flight need not enter into the definition; for there are many birds which are perfectly destitute of that power, as the ostrich, the cassowary, all the penguins, and some other birds. The feathers with which birds are covered are analogous in their nature to the hair of quadrupeds, being composed of a similar substance appearing in a dissimilar form. Beneath, or under the common feathers or general plumage, the skin in birds is immediately covered with a much finer and softer feathery substance, called down. The external, or common feathers, are called by different names on different parts of the animal. The longest of the wing-feathers, which are generally ten in number in each wing, are called the first or great quills, (in the Linnæan phrase, ***remiges primores***, as being the chief oars or guides as it were.) The feathers constituting the middle part of the wing are called the secondaries, or second quills, (*remiges secundarii* of Linnæus,) and are more numerous than the first; the feathers descending along each side of the back are called the scapular feathers; the small feathers covering the shoulders are called the smaller wing-coverts, (*tectrices minores*); the next series to these are called the larger wing-coverts, *tectrices secundariæ*, or *majores*); and at the edge of the shoulder are a few rather strong and slightly lengthened feathers, constituting what is called the false or spurious wing—the alula or alulet of some ornithologists. The tail, in most birds, consists of twelve feathers, in some of ten only, in some of eighteen, twenty, or twenty-four. Sometimes on each side of the tail, or above it, at the lower part of the back, are placed several very long feathers of a very different structure from the rest: these have been called the hypochondrial and uropygial feathers. The above are the principal distributions of the feathers on a bird. With respect to the particular shape of the feathers themselves, they vary greatly in the different tribes.

The particulars most important in the comparative anatomy of birds are these: the heart is furnished with two cavities, or, in the language of anatomists, is bilocular, and the general course of the circulation is carried on as in quadrupeds. The lungs are very large, affixed to the back part of the cavity of the breast, and are furnished with several external orifices, by which the air they contain is at pleasure communicated to other parts of the frame. The throat, after passing down to a certain distance, dilates into a large membranaceous bag, answering to the stomach in quadrupeds: it is called the crop, and its great use is to soften the food taken into it, in order to prepare it for passing into another stronger receptacle, called the gizzard: this, which may be considered a more powerful stomach than the former, consists of two very strong muscles, lined and covered with a stout tendinous coat, and furrowed on the inside: in this receptacle, the food is completely ground, and reduced to a pulp. In the predaceous birds, or *Accipitres*, the gizzard is wanting, the stomach being more allied to that of quadrupeds.

Birds, as every one knows, are oviparous animals, always producing eggs, from which the young are afterwards excluded. The process of the young in the egg, from the time of its first production to that of its complete formation, is extremely curious and interesting, and may be found detailed with sufficient exactness in the works of Malpighi, Buffon, Monro, and others. The first appearance of the young, as an organized body, begins to be visible in six hours after the egg has been placed in a proper degree of heat; and a particular, highly worthy of attention, is, that the chick, or young bird, when arrived at its full size, and ready for hatching, is by nature provided with a small, hard, calcareous protuberance at the point or tip of the bill, by which it is enabled the more readily to break the shell, and which falls off some hours after hatching. So careful has Nature been, and so accurately has every circumstance attending the process been foreseen and provided for!

PLATE XIV.—CONCHOLOGY.

FIG. 1. and 7. *Bulla lignaria*, LINN. LAM. Coast of Europe.

FIG. 2, 3, 4, 5, 8. *Conus ammiralis*, LINN. LAM. To this most varied species belong those beautiful varieties called *Cedo nulli cones*, so highly prized by collectors. They come chiefly from the Antilles.

FIG. 6. *Turbo trilineatus*, LINN.

FIG. 9. *Turbo fusiformis*, LINN.

FIG. 10. *Helix hortensis*, LINN. LAM. This variable snail is common in the gardens of Europe, whence its name.

FIG. 11. *Nerita canrena*, LINN. *Natica canrena*, LAM. Inhabits the seas both of India and America.

General Observations on Molluscous Animals, &c.

The *Mollusca* have neither an articulated skeleton nor a vertebral canal. Their nervous system is not united in a spinal marrow, but merely consists in disseminated portions, which, however, communicate with each other. The *circulation* of the Mollusca is always double; in other words, there is a distinct circle of pulmonary vessels. The blood of these animals is white, or bluish, and it appears to contain a smaller proportionate quantity of febrine than that of the vertebral animals; and there is reason to believe that their veins perform the office of absorbent vessels.

Their muscles are attached to various points of their skin, enabling them to perform all the different motions by which they creep, seize their prey, &c. &c.

Most of the Mollusca have a skin that covers the body, and bears some resemblance to a mantle. The *Naked Mollusca* are those in which the mantle is simply membranous, or fleshy; generally, however, this envelope is of a shelly consistence, which has given to the animals that possess it the name of *testaceous mollusca.* The shell is covered by a thin skin, or epidermis, which is often dry, and easily rubbed off.

The variety in the form, colour, surface, and brilliancy of shells, is almost infinite; most of them are calcareous; some are horny.

Cuvier divides the Mollusca into six classes, as follow:—

1. *Cephalopoda.* The body resembles a sac open in front, containing the branchiæ, whence issues the head, crowned with fleshy projections, by means of which they crawl, and seize various objects. In this class rank the Nautilus, Ammonite, Spirula, and other shells.

2. *Pteropoda.* In these, the appendages of the head are wanting, or are very small; the principal organs of locomotion are two wings, or membranous fins, situated on the sides of the neck. This class embraces but few genera, among which are Hyalæa, Cleodora, Pyrgo, &c.

3. *Gasteropoda.* These crawl by means of a fleshy disk on the abdomen, and have almost always a distinct head. This class embraces a vast number of shells, among which are the well-known genera Lymnea, Helix, Achatina, Turbo, Ampullaria, Ianthina, Cyprea, Voluta, Oliva, Buccinum, Harpa, Cassis, Cerithium, Murex, Fusus, Strombus, Halyotis, Patella, Chiton, and many more both land and marine shells.

4. *Acephala.* In these the mouth is hidden in the bottom of the mantle, which also incloses the branchiæ and viscera, and is open throughout its whole length, at both ends, or at one end only. Among these are the genera Ostrea, Pecten, Lima, Anomia, Spondylus, Perna, Pinna, Arca, Mytilus, Chama, Cardium, Donax, Venus, Lucina, Tellina, Mactra, Mya, Pholas, Teredo, together with the whole series of Unio, Anodonta, and Alasmodonta, of which the rivers of the United States furnish so great a variety.

5. *Brachiopoda.* This class comprises those shells, which are also inclosed in a mantle, but without an apparent head, but are furnished with fleshy or membranous arms, with cilia of the same nature. Among these rank the genera Lingula, Terebratula, Spirifer, and a very few others; most of the species being found only in a fossil or mineralized state.

6. *Cirrhopoda.* These, although similar to the other Mollusca in the mantle, branchiæ, &c. differ from them in having numerous horny and articulated limbs, and a nervous system more nearly allied to the ARTICULATA. To this class belong, Anatifa, Balanus, Otion, Pollicipes, and a very few other genera.

In modern times, the study of the Mollusca and their coverings has become very important from geological considerations. As particular genera are known to belong to particular strata of the earth's crust, and as the positions assumed by the living animals are known, the ascertained position of the fossils determines, with sufficient certainty, whether the strata has undergone removal, disruption, or subversion since the death of the animals.

The most interesting considerations are presented to the inquiring mind by some of the genera of microscopic shells; and the magnitude of the results produced by their infinite multiplicity, causes their importance in the economy of nature to be felt with astonishment and admiration. Take, for instance, the *Miliolites*, thus commented on by Lamarck: "The *Miliolites* is a shell of most singular form, and perhaps one of the most interesting to study, on account of its multiplicity in nature, and the influence which it has upon the condition and size of the masses at the surface of the earth, or which compose its external crust. It is one of those numerous examples which prove that, in producing living bodies, what nature seems to lose in size, she fully regains in the number of individuals, which she multiplies to infinity, and with a readiness almost miraculous. The bodies of these minute animals exert more influence on the condition of the masses which compose the surface of the earth, than those of the largest animals, such as elephants, hippopotami, whales, &c., which although constituting much larger individual masses, are infinitely less multiplied in nature. In the environs of Paris, some species of Miliolites are found in so great a quantity that they form almost the principal part of the stony masses of certain ranges."

The naturalists of the United States have contributed much valuable matter on the science of Conchology; and some new genera, and many new species, have been added by their labours.

PLATE XV.—ICHTHYOLITE.

The figure on this plate represents a fossil fish, as they are found in the quarries of black slate at Isleben, in Saxony, where several species are obtained in remarkable preservation.

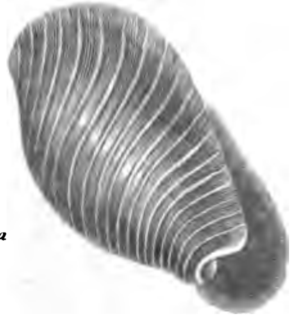
The fishes, in some instances, are found nearly entire, the harder parts being in their natural situations, with the scales, and even portions of the skin, preserved. In other instances, nothing remains but the skeleton, the bones of which mostly appear much displaced.

There is, perhaps, no class of animals in the fossil state which have so many analogies among the species now known to inhabit the different seas: thus, according to Count Lacepede, more than thirty Asiatic, African, and American species of fishes, have been found in the fossil state, at Verona, in Italy. Near this city is the celebrated Monte Bolca, an elevation composed of a light-coloured slate, between the lamina of which the fishes are found. M. Bozza, the proprietor of a great collection of specimens from this locality, mentions the remarkable fact, that among about a hundred of them whose species are still in existence, four are peculiar to the seas of Otaheite, in the Pacific ocean.

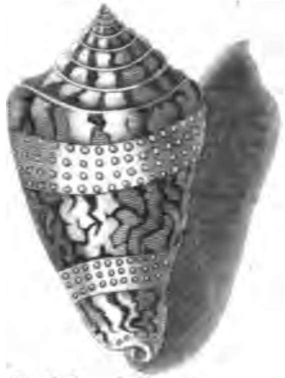
The pike, carp, perch, eel, mackarel, turbot, and sword-fish, have already been found in a mineralized state in various parts

CONCHOLOGY.

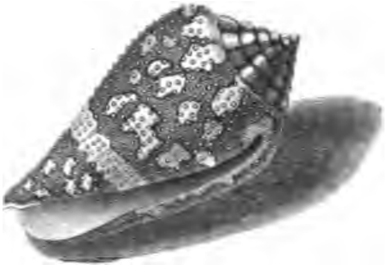
GENUS *BULLA* _ G. *CONUS* _ G. *TURBO* _ G. *HELIX* _ G. *NERITA*.



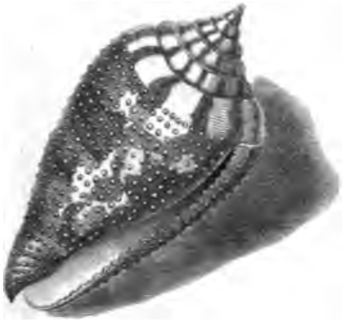
1. *B. lignaria*



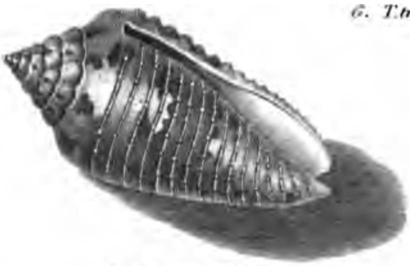
2. *C. Ammiralis var.* Banded Cedo nulli Cone



3. *C. Ammiralis var.* Sebas C.n.C.

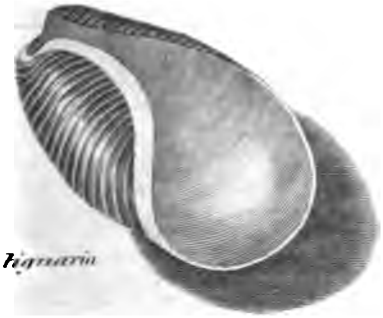


4. *C. Ammiralis var.* Curacao C.n.C.

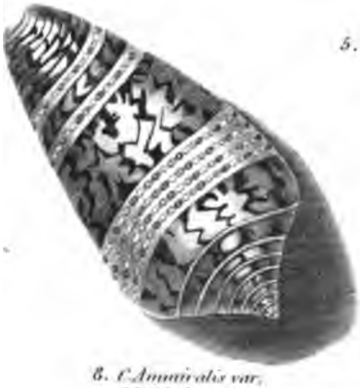


5. *C. Ammiralis var.* Southern C.n.C.

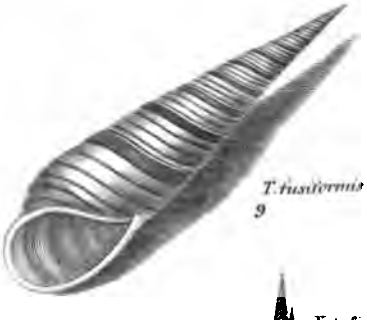
6. *T. trilineatus*



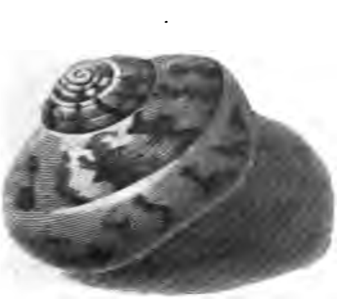
7. *B. lignaria*



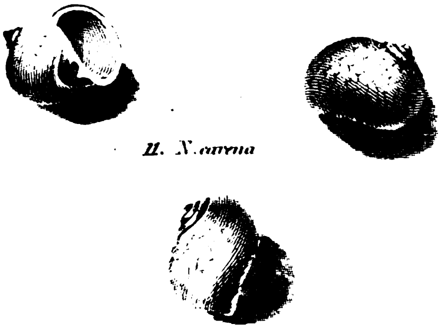
8. *C. Ammiralis var.* Marbled C.n.C.



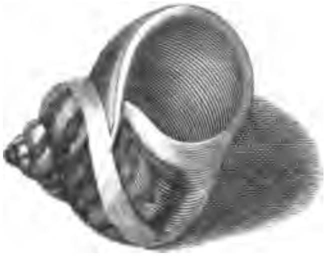
T. fusiformis 9



10. *H. hortensis*



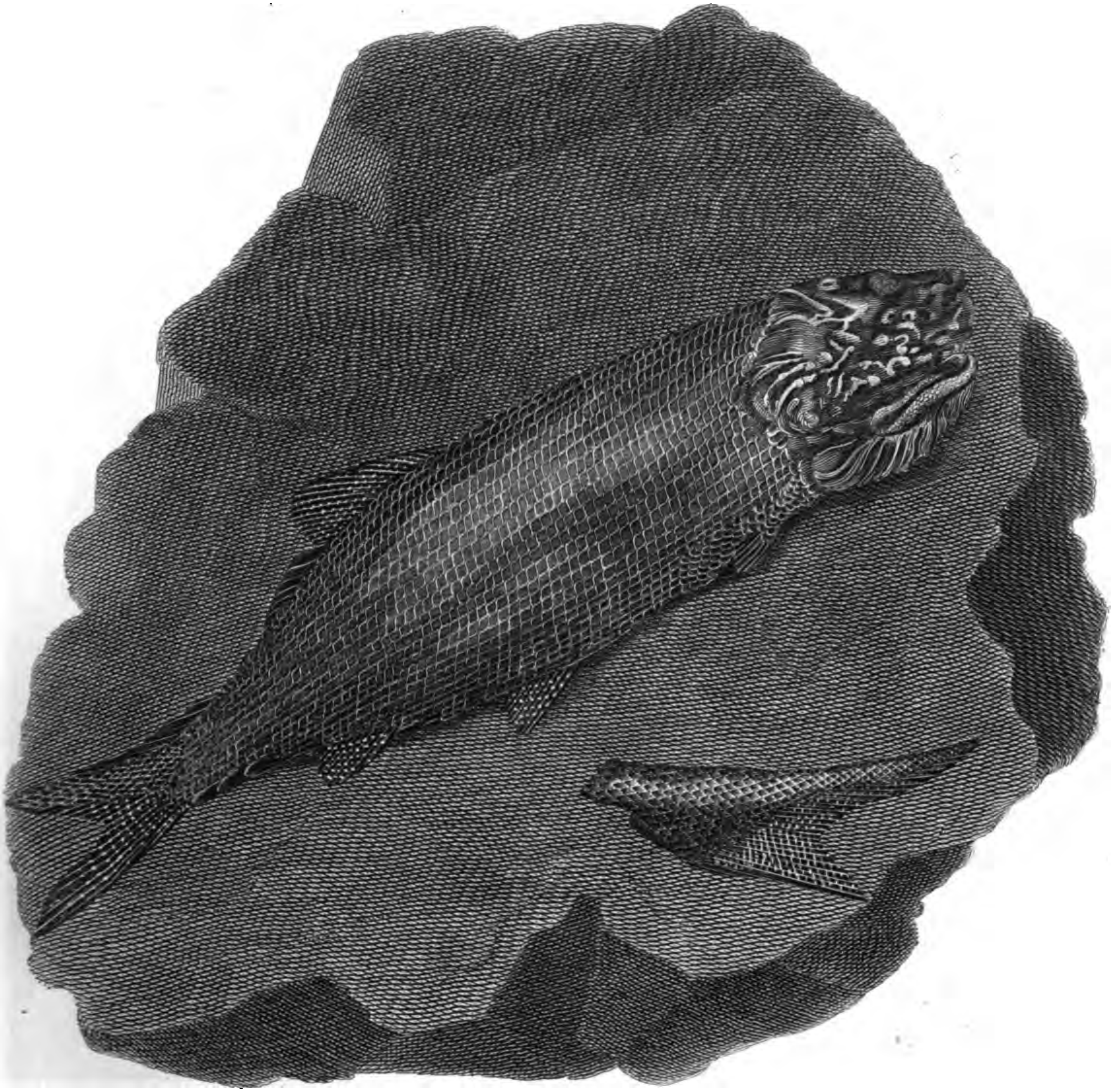
11. *N. canrena*



12. *H. hortensis*

ICHTHYOLITE.

Ichthyological remains.



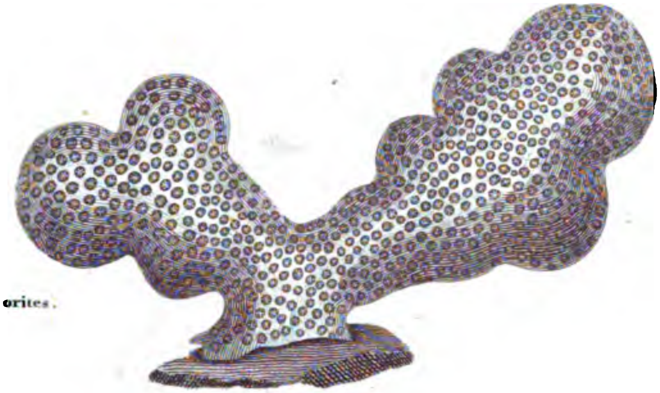
Impression of Fishes on Black Schistus Slate found at Isleben in Germany.

Linn Syst.

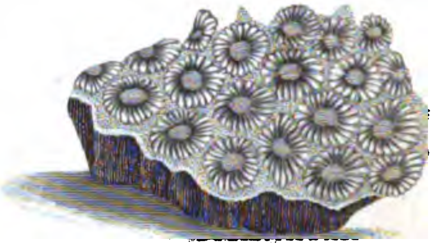
ZOOPHYTES.

GENUS *MADREPORA*.

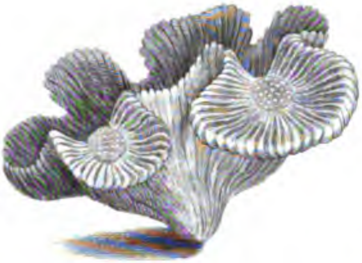
PLATE 16.



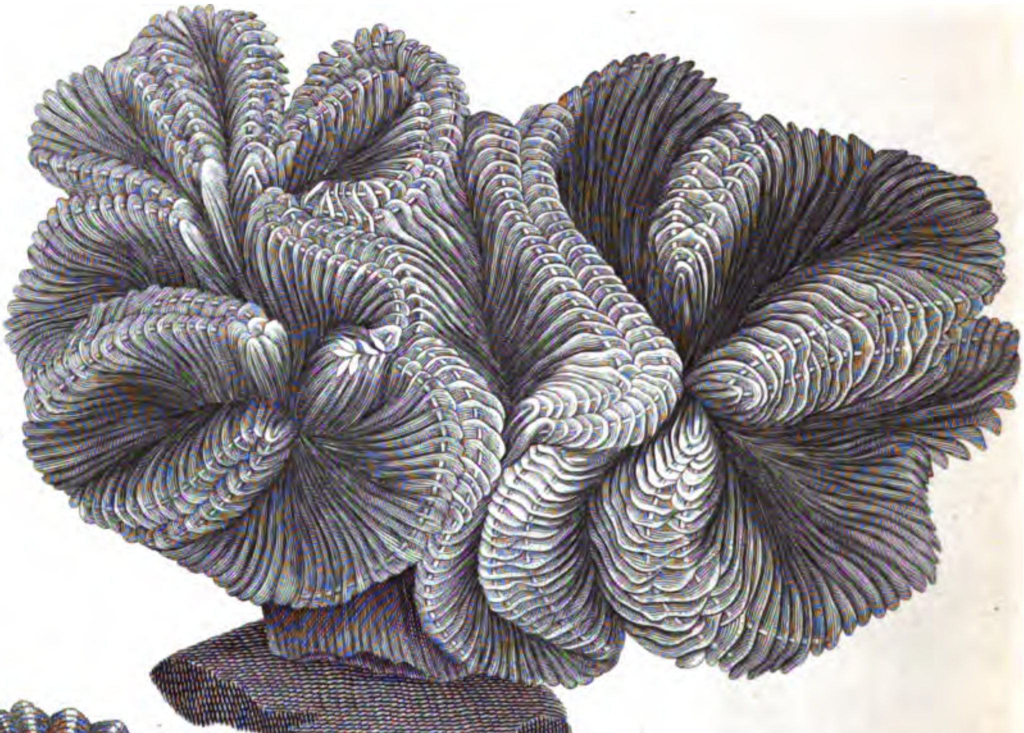
1. M.porites.



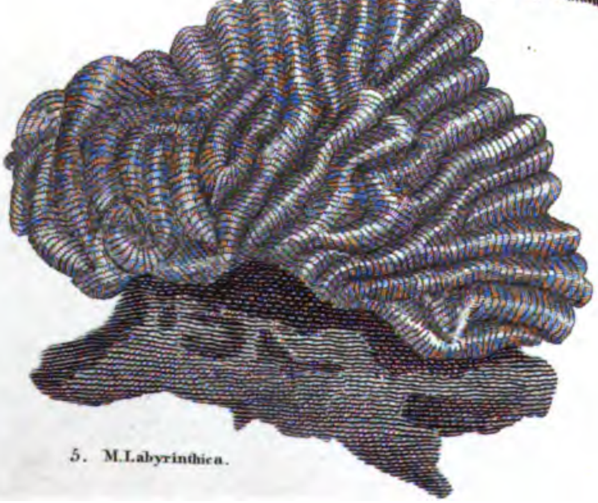
2. M.ananas.



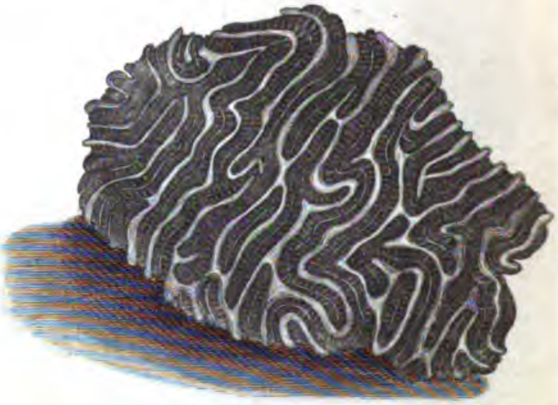
3. M.areolata.



4. Madrepora gyrosa.



5. M.Labyrinthica.



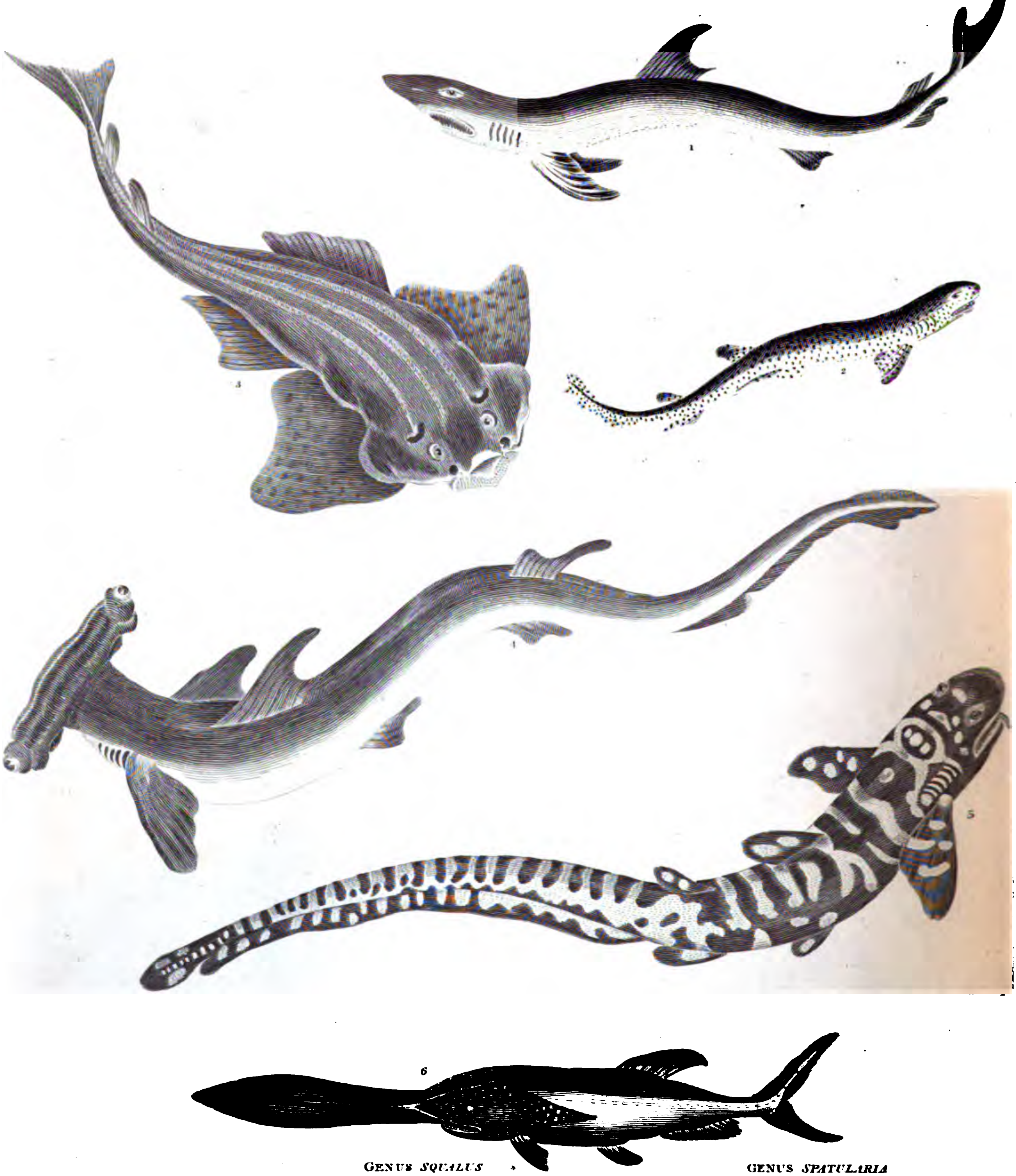
6. M.phrygia.

H.Anderson sc.

Linn. Syst. **PLATE 17.**

ICHTHYOLOGY.

ORDER CHONDROPTERYGI.



GENUS *SQUALUS*
(Shark)

GENUS *SPATULARIA*

1. S. *Glaucus*.	2. S. *Catulus*	3. S. *Squatina*.	4. S. *Zygæna*.	5. S. *Zebra*.	6. Sp. *reticulata*.
BLUE S.	*LESSER SPOTTED DOG FISH.*	*ANGEL S.*	*HAMMERHEADED S.*	*ZEBRA S.*	*RETICULATED S.*

Mutlow sc.

of Italy, France, and Germany. The lias, oolite, and chalk strata, all contain these remains, especially the teeth of some species of shark, which are in perfect preservation: the marls of New-Jersey, which are of the same age as the chalk of Europe, abound in these latter relics.

PLATE XVI.—VERMES.

ZOOPHYTES, *Linn.* RADIATA, *Cuv.*

The *radiated animals*, or *Zoophytes*, include a number of beings whose parts are arranged round an axis and on one or several radii, or on one or several lines extending from one pole to the other.

The nervous system is rarely evident in this obscure class of animals, nor is there any true circulating system. In some genera, as the Holothuria, we can detect the two terminal orifices of the intestinal canal; but in the greater number, there is merely a cavity excavated in the substance of the body, which opens by several suckers; and again there are others which, from their peculiar organization, can only be nourished by porous absorption.

The simple construction of these animals, and the radiating disposition of their organs, which reminds us of the petals of flowers, has obtained for them the name of *Zoophytes*, or *Animal-plants*, by which nothing more is meant than their apparent affinity; for as Zoophytes enjoy the sense of touch and the power of voluntary motion, mostly feed on substances they have swallowed, and digest them in an internal cavity, they are certainly animals in every point of view. (Vide *Cuvier.*)

The following species belong to Cuvier's fourth class of RADIATA, called POLYPI.

FIG. 1. *Madrepora porites*, LINN. *Astrea porites*, CUV.
FIG. 2. *Madrepora ananas*, LINN. *Astrea ananas*, CUV.
FIG. 3. *Madrepora areolata*, LINN. *Meandrina areolata*, LAM.
FIG. 4. *Madrepora gyrosa*, LINN. *Meandrina gyrosa*, LAM.
FIG. 5. *Madrepora labyrinthica*, LINN. *Meandrina labyrinthica*, LAM.
FIG. 6. *Madrepora phrygia*, LINN. *Meandrina phrygia*, LAM.

PLATE XVII.—ICHTHYOLOGY.

FIG. 1. *Squalus glaucus*, LINN. *Carcharias glaucus*, CUV.
FIG. 2. *Squalus catulus*, LINN. *Scyllium catulus*, CUV.
FIG. 3. *Squalus squatina*, LINN. *Squatina angelus*, CUV.
FIG. 4. *Squalus zygæna*, LINN. *Zygæna malleus*, CUV.
FIG. 5. *Squalus zebra*, LINN. *Scyllium tigrinum*, CUV.
FIG. 6. *Spatularia reticulata*, LINN. *Polyodon folium*, CUV.

SHARKS.

The family of the sharks is celebrated for the size and voracity of many of the species. The form of the body is elongated, and the tail thick and fleshy. The mouth is large, generally situated beneath the snout, and is armed with several rows of compressed, sharp-edged, and sometimes serrated teeth. The water penetrates to the gills by means of several transverse openings situated on each side of the neck. The skeleton is cartilaginous. The skin is usually very rough, covered with a multitude of little osseous tubercles; and that of some species forms the substance called *shagreen*. The eggs of the shark are few and large, in comparison with those of bony fishes; they are enveloped in a hard, horny, semitransparent shell, terminated at the four angles with long filaments; they are frequently cast up by the waves upon the shores of the sea. The flesh of sharks is, in general, hard, coriaceous, and ill-tasted; but some are good for food. They are the most formidable and voracious of all fishes, pursue all other marine animals, and seem to care little whether their prey be living or dead. They often follow vessels for the sake of picking up any offal which may be thrown overboard; and man himself often becomes a victim to their rapacity. The sharks form several genera, distinguished by the presence or absence of blow-holes, or of the anal fin, by the form of the head, nose, teeth, &c. &c. The teeth of sharks are movable at the will of the animal, and are usually laid down and directed backwards, but become erect at the moment the animal is seizing his prey. Shagreen, which is extensively used in the arts, is furnished by several species, and, together with their oil, forms the most important of their products. The basking shark (*Selache maxima*) is by far the largest of the genus, sometimes attaining the length of forty feet; but it has none of the ferocity of the others, and the teeth are excessively small. It inhabits the northern seas, and is occasionally taken along our coast, as far south as New-Jersey. It is sometimes called *Whalebone Shark*, from having in the mouth a substance resembling whalebone. The hammerheaded sharks (*Zygaena*) are remarkable among fishes, for having the head flattened and projecting laterally, which gives to the animal something of the form of a hammer. The eyes are placed at the extremity of these prominences. They are very voracious, and attack man without fear: one or more species are found along the coast of the United States. The species of *Squalina* differ from the other sharks in having the mouth terminal, the body flattened horizontally, the pectoral fins large, and the eyes on the upper part of the head. One species is found in our waters. The long-tailed shark, or thresher, also frequents our coasts; it is distinguished by having the tail as long as the body. Some others have been seen in our bays, although little has been written respecting them.

All our readers will call to mind numerous anecdotes of the voracity of sharks. That they are sufficiently formidable to man, a recent instance affords strong evidence, a fisherman in Boston Bay having been but lately attacked in his boat, and devoured by one of these animals.

The following lively description, from the pen of a recent voyager whose book is not yet before the American public, will be read with interest.

SHARK CATCHING.

"There would seem to be a sort of perpetual and hereditary war waged between sailors and sharks, like that said to exist between the Esquimaux and the Indians of North America, where, as each of the belligerents is under the full belief that every death, whether natural or violent, is caused by the machinations of the other side, there is no hope of peace between them as long as the high conflicting parties shall be subject to the laws of mortality.

"In like manner, I fear, that in all future times, as in all times past, when poor Jack falls overboard in Madras roads, or in Port Royal harbour, he will be liable to be crunched between the shark's quadruple or quintuple rows of serrated teeth, with as merciless a spirit of enjoyment as Jack repays the compliment withal, when, in his turn, he catches his enemy on his decks. Certainly, I have never seen the savage part of our nature peep out more clearly than upon these occasions, when a whole ship's company, captain, officers, and young gentlemen, inclusive, shout in triumphant exultation over the body of a captive shark, floundering in impotent rage on the poop or forecastle. The capture always affords high and peculiar sport, for it is one in which every person on board sympathizes, and, to a certain extent, takes a share. Like a fox-chase, it is ever new, and draws within its vortex every description of person. The lunarian, busy taking distances, crams his sextant hastily into its case; the computer, working out his longitude, shoves his books on one side: the marine officer abandons his eternal flute; the doctor starts from his nap; the purser resigns the Complete Book; and every man and boy, however engaged, rushes on deck to see the villain die. Even the monkey, if there be one on board, takes a vehement interest in the whole progress of this wild scene. I remember once observing Jacko running backwards and forwards along the after part of the poop-hammock netting, grinning, screaming, and chattering at such a rate, that, as it was nearly calm, he was heard all over the decks. 'What 's the matter with you, master Mona?' said the quarter-master; for the animal came from Teneriffe, and preserved his Spanish cognomen. Jacko replied not, but merely stretching his head over the railing, stared with his eyes almost bursting from his head, and by the intensity of his grin bared his teeth and gums nearly from ear to ear. The sharp curved dorsal fin of a huge shark was now seen, rising about six inches above the water, and cutting the glazed surface of the sea by as fine a line as if a sickle had been drawn along. 'Messenger! run to the cook for a piece of pork,' cried the captain, taking command with as much glee as if it had been an enemy's cruiser he was about to engage. 'Where 's your hook, quarter-master?' 'Here, sir, here!' cried the fellow, feeling the point, and declaring it as sharp as any lady's needle, and in the next instant piercing with it a huge junk of rusty pork, weighing four or five pounds; for nothing scarcely is too large or too high in flavour for the stomach of a shark. The hook, which is as thick as one's little finger, has a curvature about as large as that of a man's hand when half closed, and is from six to eight inches in length, with a formidable barb. This fierce-looking grappling-iron is furnished with three or four feet of chain, a precaution which is absolutely necessary, for a voracious shark will sometimes gobble the bait so deep into his stomach, that but for the chain he would snap through the rope by which the hook is held, as easily as if he were nipping the head off an asparagus.

"A good strong line, generally the end of the mizen topsail haulyards, being made fast to the chain, the bait is cast into the ship's wake, for it is very seldom so dead a calm that a vessel has not some small motion through the water. I think I have remarked, that at sea the sharks are most apt to make their appearance when the ship is going along at a rate of somewhat less than a mile an hour, a speed that barely brings her under command of the rudder, or gives her what is technically called steerage way. A shark, like a midshipman, is generally very hungry; but in the rare cases when he is not in good appetite, he sails slowly up to the bait, smells to it, and gives it a poke with his shovel nose, turning it over and over. He then edges off to the right or left, as if he apprehended mischief, but soon returns again, to enjoy the delicious haut gout, as the sailors term the flavour of the damaged pork, of which a piece is always selected if it can be found. While this coquetry, or shyness, is exhibited by John Shark, the whole after part of the ship is so clustered with heads, that not an inch of spare room is to be had for love or money. The rigging, the mizen-top, and even the gaff, out to the very peak, the hammock-nettings, and the quarters, almost down to the counter, are stuck over with breathless spectators, speaking in whispers, if they venture to speak at all, or can find leisure for any thing but fixing their gaze on the monster, who as yet is free to roam the ocean, but who, they trust, will soon be in their power. I have seen this go on for an hour together; after which the shark has made up his mind to have nothing to say to us, and either swerved away to windward, if there be any breeze at all, or dived so deep that his place could be detected only by a faint touch or flash of white, many fathoms down. The loss of a Spanish galleon, in chase, I am persuaded, could hardly cause more bitter regret, or call forth more intemperate expressions of anger and impatience, than the failure in hooking a shark is always sure to produce on board a ship at sea.

"On the other hand, I suppose the first symptoms of an enemy's flag coming down in the fight, was never hailed with greater joy than is felt by a ship's crew on the shark turning round to seize the bait. The preparatory symptoms of this intention are so well known to every one on board, that, the instant they begin to appear, a greedy whisper of delight passes from mouth to mouth amongst the assembled multitude; every eye is lighted up, and such as have not bronzed their cheeks by too long exposure to sun and wind to betray any change of colour, may be seen to alter their hue from pale to red, and back to pale again, like the tints on the sides of the dying dolphin.

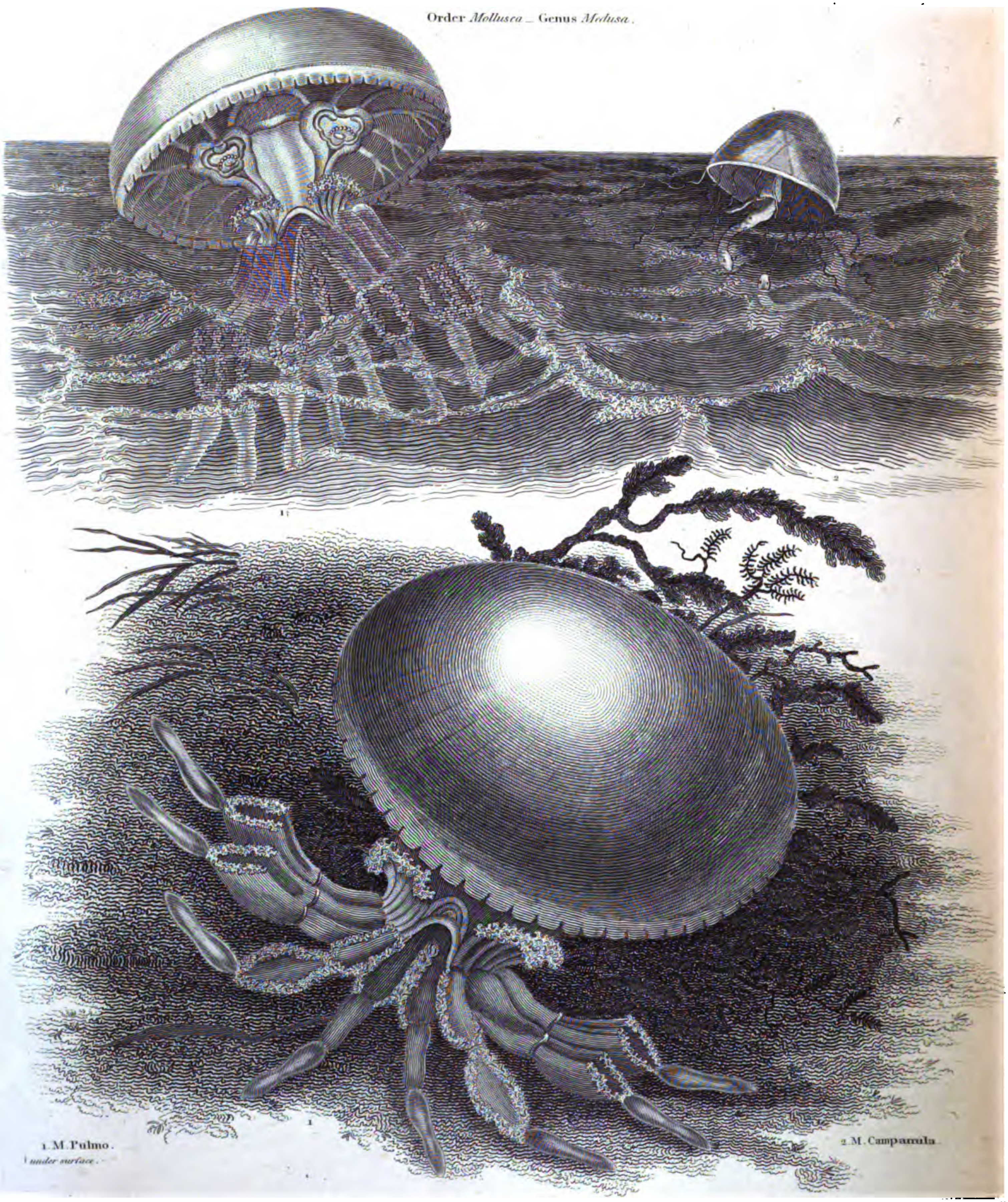
"It is supposed by seamen that the shark must of necessity turn on his back before he can bite any thing; and, generally speaking, he certainly does so turn himself before he takes the bait. But this arises from two circumstances; one of them accidental, and belonging to the particular occasion, the other arising out of the peculiar conformation and position of his mouth.

"When a bait is towed astern of a ship that has any motion through the water at all, it is necessarily brought to the surface, or nearly so. This of course obliges the shark to bite at it from below; and as his mouth is placed under his chin, not over it like that of a christian, he must turn nearly on his back before he can seize the floating piece of meat in which the hook is concealed. Even if he does not turn completely round, he is forced to slue himself, as it is called, so far as to show some portion of his white belly. The instant the white skin flashes on the sight of the expectant crew, a subdued cry, or murmur of satisfaction, is heard among the crowd; but no one speaks, for fear of alarming the shark.

"Sometimes, at the very instant the bait is cast over the stern, the shark flies at it with such eagerness that he actually springs partially out of the water. This, however, is rare. On these occasions, he gorges the bait, the hook, and a foot or two of the chain, without any mastication or delay, and darts off with his treacherous prize with such prodigious velocity and force, that it makes the rope crack again as soon as the coil is drawn out. In general, however, he goes more leisurely to work, and seems rather to suck in the bait than to bite at it. Much dexterity is required in the hand which holds the line at this moment; for a bungler is apt to be too precipitate, and to jerk away the hook before it has got far enough down the shark's maw. Our greedy friend, indeed, is never disposed to relinquish what may once have passed his formidable batteries of teeth; but the hook, by a premature tug of the line, may fix itself in a part of the jaw so weak, that it gives way in the violent struggle which always follows. The secret of the sport is, to let the voracious monster gulp down the huge mess of pork, and then to give the rope a violent pull, by which the barbed point, quitting the edge of the bait, buries itself in the coats of the victim's throat or stomach. As the shark is not a personage to submit patiently to such treatment, it will not be well for any one whose foot happens to be accidentally on the coil of the rope when the hook is first fixed; it spins out like the log-line of a ship going twelve knots. The suddenness of the jerk with which the poor devil is brought up, when he reaches the length of his tether, often turns him quite over on the surface of the water. Then commence the loud cheers, taunts, and other sounds of rage and triumph, so long suppressed. A steady pull is insufficient to carry away the line; but it sometimes happens that the violent struggles of the shark, when too speedily drawn up, snap either the rope or the hook, and so he gets off, to digest the remainder as he best can. It is, accordingly, held the best practice to play him a little, with his mouth at the surface, till he becomes somewhat exhausted. During this operation, one could almost fancy the

Linn. Syſt. **VERMES.** *PLATE 18.*

Order *Mollusca* _ Genus *Medusa*.



1. M. Pulmo.
1 *under surface.*

2. M. Campanula.

enraged animal is conscious of the abuse which is flung down upon him; for, as he turns, and twists, and flings himself about, his eye glares upwards with a ferocity of purpose which makes the blood tingle in a swimmer's veins, as he thinks of the hour when it may be his turn to writhe under the tender mercies of his sworn foe!

"No sailor, therefore, ought ever to think of hauling a shark on board merely by the rope fastened to the hook; for, however impotent his struggles may generally be in the water, they are rarely unattended with risk when the rogue is drawn half way up. To prevent the line breaking or the hook snapping, or the jaw being torn away, the device formerly described, of a running bow-line knot, is always adopted. This noose, being slipped down the rope and passed over the monster's head, is made to join at the point of junction of the tail with the body. When this is once fixed, the first act of the piece is held to be complete, and the vanquished enemy is afterwards easily drawn over the taffrail and flung on the deck, to the unspeakable delight of all hands. But although the shark is out of his element, he has by no means lost his power of doing mischief; and I would advise no one to come within range of his tail, or trust his toes too near the animal's mouth. The blow of a tolerably large-sized shark's tail might break a man's leg; and I have seen a three inch hide tiller-rope bitten more than half through, full ten minutes after the wretch had been dragged about the quarter-deck, and had made all his victors keep at the most respectful distance. I remember hearing the late Dr. Wollaston, with his wonted ingenuity, suggest a method for measuring the strength of a shark's bite. If a smooth piece of lead, he thought, were thrust into the fish's mouth, the depth which the teeth would pierce the lead would furnish a sort of scale of the force exerted.

"I need scarcely mention, that when a shark is floundering about, the quarter-deck becomes a scene of pretty considerable confusion; and if there be blood on the occasion, as there generally is, from all this rough usage, the stains are not to be got rid of without a week's scrubbing, and many a growl from the captain of the afterguard. For the time, however, all such considerations are superseded, that is to say, if the commander himself takes an interest in the sport, and he must be rather a spoony skipper that does not. If he be indifferent about the fate of the shark, it is speedily dragged forward to the forecastle, amidst the kicks, thumps, and execrations of the conquerors, who very soon terminate his miserable career by stabbing him with their knives, boarding-pikes, and tomahawks, like so many wild Indians.

"The first operation is always to deprive him of his tail, which is seldom an easy matter, it not being at all safe to come too near; but some dexterous hand, familiar with the use of the broadaxe, watches for a quiet moment, and at a single blow severs it from the body. He is then closed with by another, who leaps across the prostrate foe, and with an adroit cut rips him open from snout to tail, and the tragedy is over so far as the struggles and sufferings of the principal actor are concerned. There always follows, however, the most lively curiosity on the part of the sailors to learn what the shark has got stowed away in his inside; but they are often disappointed, for his stomach is generally empty. I remember one famous exception, indeed, when a very large fellow was caught on board the Alceste, in Anjier Roads at Java, when we were proceeding to China with the embassy under Lord Amherst. A number of ducks and hens which had died in the night, were, as usual, thrown overboard in the morning, besides several baskets, and many other minor things, such as bundles of shavings and bits of cordage, all of which were found in the huge sea-monster's inside. But what excited most surprise and admiration was the hide of a buffalo, killed on board that day for the ship's company's dinner. The old sailor who had cut open the shark stood with a foot on each side, and drew out the articles, one by one, from the huge cavern into which they had been indiscriminately drawn. When the operator came at last to the buffalo's skin, he held it up before him like a curtain, and exclaimed, 'There, my lads; d'ye see that! He has swallowed a buffalo, but he could not dis-gest the hide!'

"I have never been so unfortunate as to see a man bitten by a shark, though, in calm weather, it is usual to allow the people to swim about the ship. It would seem that they are disturbed by the splashing and other noises of so many persons, and keep at a distance; for although they are often observed swimming near the ship both before and after the men have been bathing, they very rarely come near the swimmers. I remember, once, indeed, at Bermuda, seeing a shark make a grab at a midshipman's heel, just as he was getting into the boat alongside. This youngster, who, with one or two others, had been swimming for about an hour, was the last of the party in the water. No shark had been seen during the whole morning; but just as he was drawing his foot into the boat, the fish darted from the bottom. Fortunately for my old messmate, there was no time for the shark to make the half turn of the body necessary to bring his mouth to bear; and thus my friend escaped, by half an inch, a fate which, besides its making one shudder to think of, would have deprived the service of an active young officer, now deservedly in the higher ranks of his profession."

PLATE XVIII.—MEDUSA, *Linn.*

Fig. 1. *Medusa pulmo*, Gmel. *Rhizostoma pulmo*, Cuv.

This singular animal is found on the southern coasts of Europe, but is principally observed at low water. Its umbrella is sometimes nearly two feet wide; its pedicle is divided into four pairs of arms, almost infinitely forked and dentated, each one being furnished at its base with two auricles that are also dentated; a fine net-work extends round the umbrella, in the thickness of the margin.

Fig. 2. *Medusa campanula*, Linn. *Geryonia campanula*, Cuv.

In this species, the disk is gibbous; the border white and ciliate; the body is conical, beneath hollow and white. It inhabits the seas of Greenland.

An intelligent physician of Philadelphia has furnished the best account of the Medusæ, an order of animated beings but rarely described. We copy his account, which will be found highly interesting and graphic.

Those who have sought relief from the summer heats at Long Branch or Cape May, have probably noticed, in their ramblings along the beach, certain gelatinous transparent masses deposited by the receding tide upon the sands. They resemble very large plano-convex lenses, and are devoid of colour except in a few minute points, which appear like grains of yellow sand, or the eggs of some shells embedded in their substance. This has led many to consider them as the spawn of some marine animal.

If one of these jellies be placed in a tub of brine immediately after it reaches the shore, the observer will be surprised to find it possessed of animation. The superior, or convex part, will expand like the top of an umbrella; and from its under surface several fringed and leaf-like membranes will be developed. The remains of numerous threads, or tendrils, will float out from the margin of the umbrella, following the motions of the animal as it swims around the tub. These threads are often several feet in length before they are broken by the sand; they are probably employed both to entice and to secure the prey, and they produce a sharp stinging sensation, when applied to the skin. It is from the appearance and offensive power of these last organs, that seamen have given the animal the title of sea-nettle, and naturalists the generic name Medusa.

I have offered this rude description of the Medusa, as a familiar example of the class of animated beings, which are the subjects of the following remarks. They are all alike gelatinous and transparent, and many of them melt and flow away when exposed in the open air to the direct rays of the sun.

Of all the tribes of Molluscæ which are scattered over every part of the ocean, the most splendid and best known is the Portuguese man-of-war (*physalia*). This is an oblong animated sack of air, elongated at one extremity into a conical neck, and surmounted by a membranous expansion running nearly the whole length of the body, and rising above into a semicircular sail, which can be expanded or contracted to a considerable extent, at the pleasure of the animal. From beneath the body are suspended from ten to fifty or more little tubes, from half an inch to an inch in length, open at their lower extremity, and formed like the flower of the blue bottle. These have been regarded as temporary receptacles for food, like the first stomach of cattle; but as the animal is destitute of any visible mouth or alimentary canal, and as I have frequently seen fish in their cavities apparently half digested, I cannot but consider them as proper stomachs; nor indeed is it a greater paradox in Zoology that an animal should possess many independent stomachs, than that the strange carnivorous vegetable, saracinea, should make use of its leaves apparently for a similar purpose.

From the centre of this group of stomachs, depends a little cord, never exceeding the fourth of an inch in thickness, and often forty times as long as the body.

The size of the Portuguese man-of-war varies from half an inch to six inches in length. When it is in motion, the sail is accommodated to the force of the breeze, and the elongated neck is curved upwards, giving to the animal a form strongly resembling the little glass swans which we sometimes see swimming in goblets.

It is not the form, however, which constitutes the chief beauty of this little navigator. The lower parts of the body and neck are devoid of colour, except a faint iridescence in reflected lights; and they are so perfectly transparent, that the finest print is not obscured when viewed through them. The back becomes gradually tinged, as we ascend, with the finest and most delicate blue that can be imagined; the base of the sail equals the purest sky in the depth and beauty of tint; the summit is of the most splendid red, and the central part is shaded by a gradual admixture of these colours, through all the intermediate grades of purples. Drawn as it were upon a groundwork of mist, the tints have an aerial softness far beyond the reach of art, and warranting the assertion, that they are often dressed in beauty before which the lily would fade, and the rose hide its blushes, and producing some of the most sublime phenomena which have ever astonished the philosopher.

The group of stomachs is less transparent, and although the hue is the same as that of the back, they are on this account incomparably less elegant. By their weight and form they fill the double office of a keel and ballast, while the cord-like appendage, which floats out for yards behind, is called by seamen the cable.

The mode in which the animal secures his prey, has been a subject of much speculation; for the fish and crabs that are frequently found within the little tubes are often large enough to tear them in pieces, could they retain their natural vigour during the contest. Deceived by the extreme pain which is felt when the cable is brought in contact with the back of the hand, naturalists have concluded, I think too hastily, that this organ secretes a poisonous or acrid fluid, by which it benumbs any unfortunate fish, or other animal, that ventures within its toils, allured by the hope of making a meal upon what, in its ignorance, it has mistaken for a worm. The secret will be better explained by a more careful examination of the organ itself. The chord is composed of a narrow layer of contractile fibres, scarcely visible when relaxed on account of its transparency. If the animal be large, this layer of fibres will sometimes extend itself to the length of four or five yards. A spiral line of blue bead-like bodies, less than the head of a pin, revolves around the cable from end to end, and under the microscope, these beads appear covered with minute prickles, so hard and sharp that they will readily enter the substance of wood, adhering with such pertinacity that the cord can rarely be detached without breaking.

It is to these prickles that the man-of-war owes its power of destroying animals which are its superiors in strength and activity. When anything becomes impaled upon the cord, the contractile fibres are called into action, and rapidly shrink from many feet in length to less than the same number of inches, bringing the prey within reach of the little tubes, by one of which it is immediately swallowed.

This weapon, so insignificant in appearance, is yet sufficiently formidable even to man. I had once the misfortune to become entangled with the cable of a very large man-of-war while swimming in the open ocean, and amply did it avenge its fellows, who now sleep in my cabinet robbed at once of life and beauty. The pain which it inflicted was almost insupportable for some time, nor did it entirely cease for twenty-four hours.

I might now proceed to describe many analogous animals scarcely inferior in interest, but it is time to notice some individuals of another tribe, residing beneath the surface, and therefore less generally known.

The grandest of these is the beroe. In size and form it precisely resembles a purse, the mouth, or orifice, answering to one of the modern metallic clasps. It is perfectly transparent; and in order to distinguish its filmy outlines, it is necessary to place it in a tumbler of brine held between the observer and the light. In certain directions, the whole body appears faintly iridescent; but there are several longitudinal narrow lines which reflect the full rich tints of the rainbow in the most vivid manner, for ever varying and mingling the hues, even while the animal remains at rest. Under the microscope, these lines display a succession of innumerable coloured scales, or minute fins, which are kept unceasingly in motion, thus producing the play of colours by continually changing the angle of reflection.

The movements of the beroe are generally retrograde, and are not aided by the coloured scales, but depend upon the alternate dilatation and contraction of the mouth. The lips are never perfectly closed, and the little fish and shrimps that play around them are continually entering and leaving them at pleasure. The animal is dependent for its food upon such semi-animated substances as it draws within its grasp by moving slowly backwards in the water, and retains them in consequence of their own feebleness and inability to escape the weakest of snares.

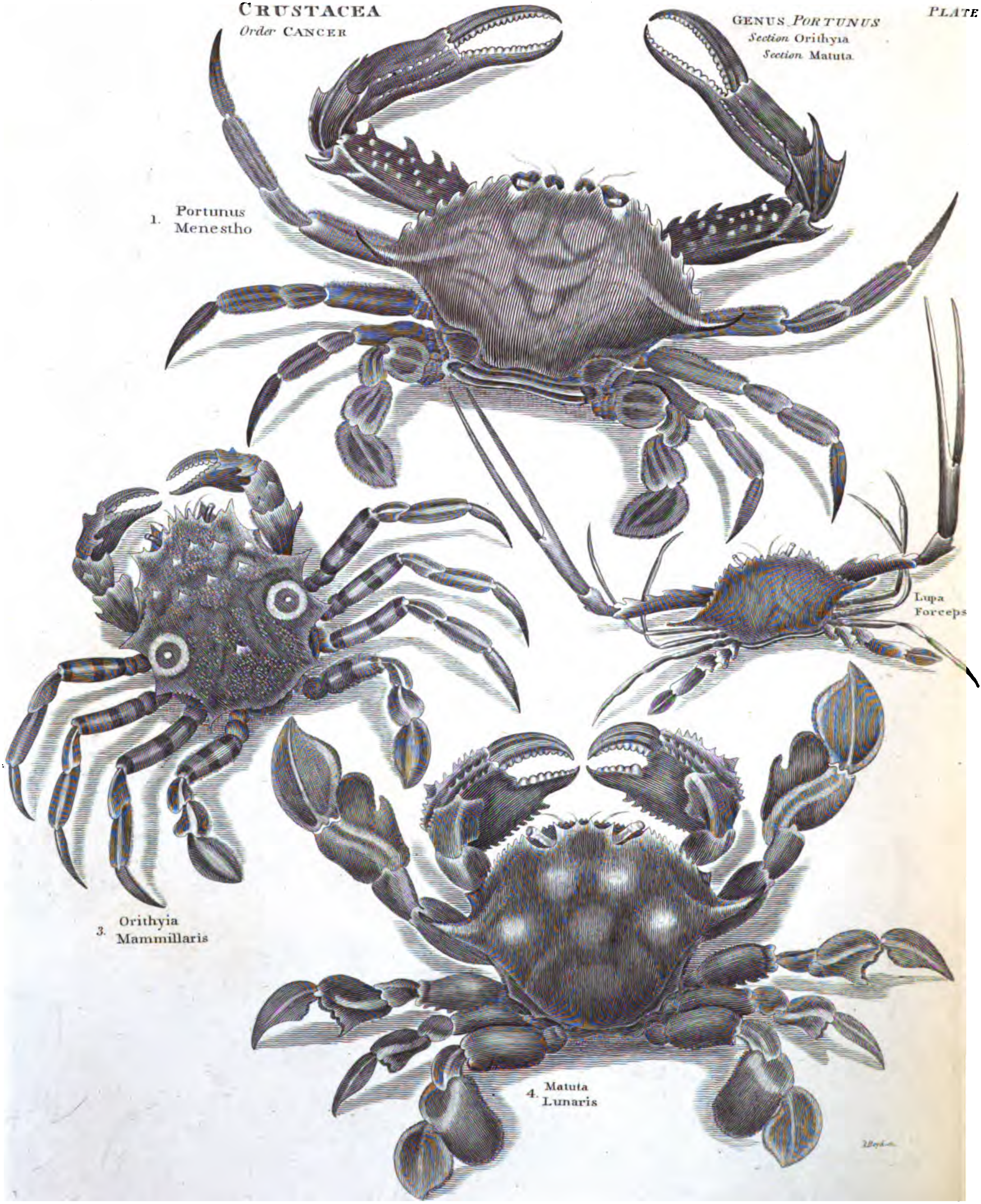
Another tribe of the sea purses, (*Salpa*,) though much smaller than the beroe, are more complex in structure, and possess a higher interest in consequence of the singular habits of some of the species. They are double sacks, resembling the beroe in general form, but destitute of iridescence. The outer sack, or mantle, rarely exceeds an inch in length, and is commonly about half as wide. The inner sack is much smaller, and the interval between these forms a cavity for the water which they breathe, and for some of the viscera. Their visible organs are, a transparent heart, which can only be seen in the strongest light; a splendid double row of whitish bead-like cavities, forming a spiral line near one extremity, and supposed to be either lungs or ovaries; numerous broad

Linn. Syst.

CRUSTACEA
Order CANCER

GENUS *PORTUNUS*
Section Orithyia
Section Matuta

PLATE 19

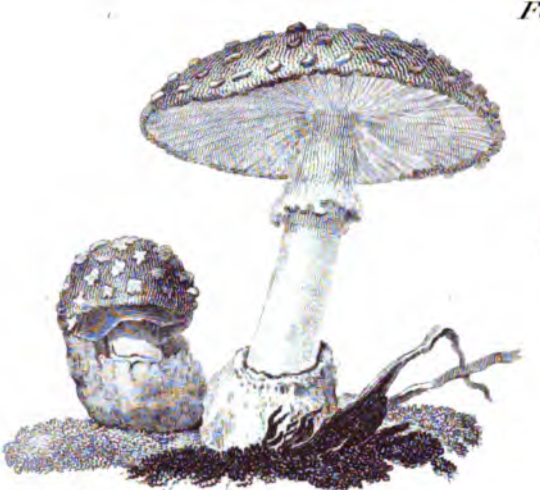


BOTANY

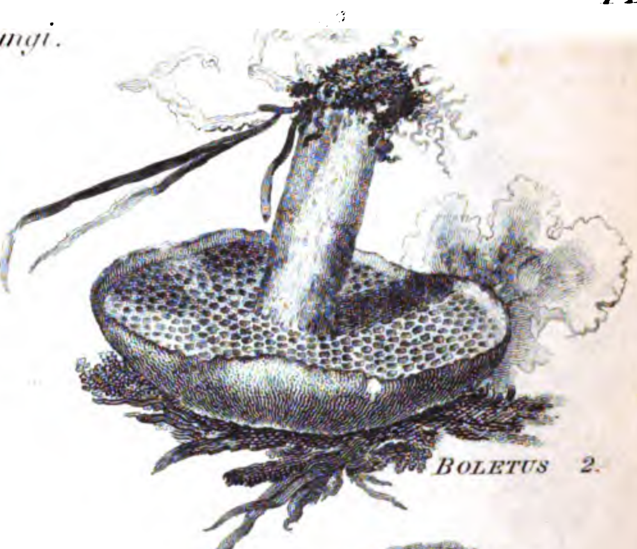
Linn. Syst.

PLATE. 20.

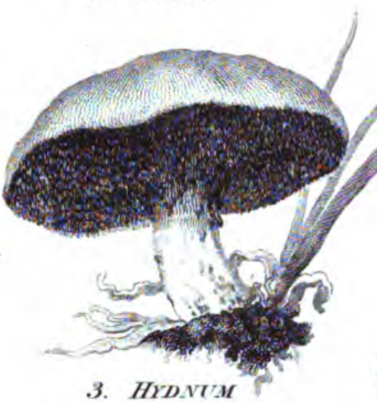
Fungi.



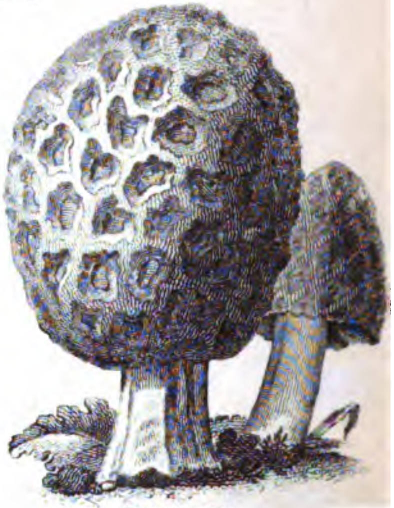
1. AGARIC



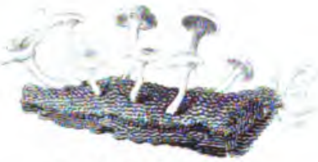
BOLETUS 2.



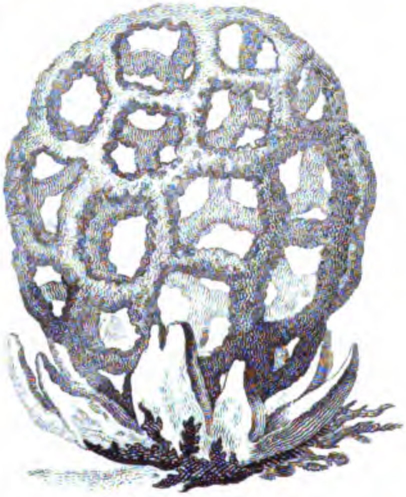
3. HYDNUM



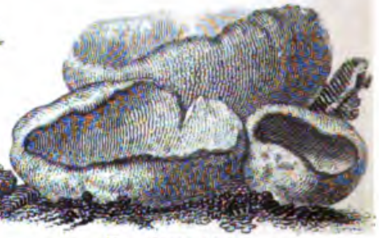
4. PHALLUS



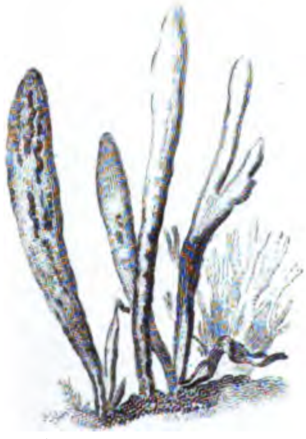
5. HELVELLA



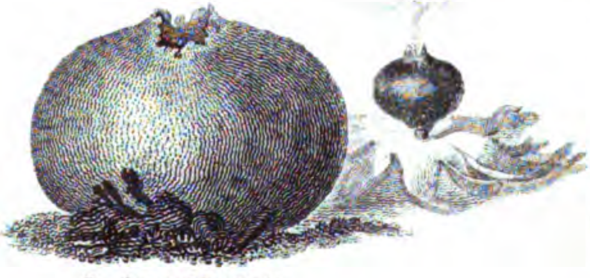
6. CLATHRUS



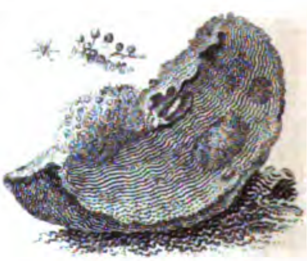
7. PEZIZA



8. CLAVARIA



9. LYCOPERDON



10. MUCOR

flat pearly muscles, barely distinguished by their mistiness; and an alimentary canal, as fine as horse-hair, with a slight enlargement at one spot, which has been called a stomach. This enlargement resembles, both in size and colour, a grain of sand. From the base of the animal arises two longer and four or five shorter conical spines of jelly, curved into hooks at the points, by means of which numerous individuals attach themselves together in double rows like the leaflets of a pennated leaf. Cords of this kind, composed of forty or fifty animals, were often taken, but they separate and reättach themselves at pleasure.

To the gregarious habits of this little mollusque, we owe a very singular and striking phenomena, which I have never seen noticed by naturalists, although we frequently witnessed it near the Cape of Good Hope. The animals are occasionally found associated together in such countless myriads, that the sea is literally filled with them, sometimes over three or four square miles of surface, and to the depth of several fathoms. The yellow spots which have been described, being the only coloured portions of their body, give to the whole tract the appearance of a shoal, or sand-bank, at some distance below the surface. The deception is heightened by the greater smoothness of the water at these places, particularly in calm weather; for so closely are the animals crowded together, that the water is rendered in a manner less fluid; the smaller billows break around the margin and are lost, while the heavy waves of the southern ocean are somewhat opposed in their progress, and take on in a slight degree the usual appearance of the ground swell. There can be but little doubt that many of the numerous shoals laid down in the charts of this region, but which have never been seen by any but the supposed discoverers, have been immense banks of these gregarious molluscæ. In sailing through a tract of this description, in which the progress of the ship was very sensibly retarded, I have dipped up with the ship's bucket a greater bulk of the animals than the water in which they were suspended. How wonderful are the effects produced by the minute links of creation!

PLATE XIX.—CRUSTACEA.

FIG. 1. *Portunus manestho*, CUV. *Cancer manestho*, LINN.
FIG. 2. *Lupa forceps*, CUV.
FIG. 3. *Cancer mammillaris*, LINN. *Orithyia mammillaris*, CUV.
FIG. 4. *Cancer lunaris*, LINN. *Matuta lunaris*, CUV.

The *Crustacea* are apterous, or destitute of wings; are furnished for the most part with compound eyes, and with four antennæ. They have also, with a few exceptions, three pairs of jaws, of which the superior two are called mandibles: they have as many foot-jaws, the last four of which, in most instances, become true feet; and ten feet properly so called, all terminated by a single small nail. When the last two pairs of foot-jaws exercise the same function, the number of feet is increased to fourteen. The mouth, as in insects, presents a *labrum* and a *lingula*, but no lower lip properly so called: the third pair of foot-jaws, or the first, closes the mouth externally, and replaces that part.

Their envelope is usually solid, and more or less calcareous. They change their skin several times, preserving, however, their primitive form and natural activity. They are mostly carnivorous and aquatic, and live for several years. They do not attain their adult state until after casting their skin a certain number of times. With the exception of a few in which these changes somewhat influence their primitive form, and modify or augment their locomotive organs, they are at birth, size apart, such as they are always to remain.—*M'Murtrie's Cuvier*.

PLATE XX.—FUNGI.

The *Fungi* are a natural order of plants, the fourth of the class Cryptogamia, as originally established by Linnæus; the species of this order are placed among the *Acotyledones* in the Natural system of Jussieu. This order includes all those productions commonly known by the name of Mushrooms, as well as a numerous tribe of similar vegetable bodies, differing in firmness, from a watery pulp of very short duration, to a leathery or even woody texture, often very permanent. They cannot properly be said to have any herbage, much less any thing like leaves or flowers in appearance, although their different parts may perform functions analogous to what are proper to those organs. ACHARIUS, like many of his predecessors, supposes them destitute of *stamina*, or *pistilla*; but this opinion is altogether theoretical, like the assertion of Jussieu, which denies them cotyledons. Neither hypothesis has been proved, nor is either of them of any practical use for the purposes of arrangement. Some have thought the *Fungi* to be of an animal nature, because of their fetid scent in decay, and because they are occasionally the habitations of insects, which were supposed to form them as the polypi do corals, an idea which is scarcely worth refuting. The supposition of others, that they originate from the transmuted sap of corrupted wood, is equally futile. They are, in fact, as distinct in genus and in species, as any other vegetables; but, like other plants, are liable to form varieties. The species of this family are vastly abundant; and Mr. De Schweinitz has shown, that no less than 2000 of them are inhabitants of the United States. The annexed plate represents ten of the most striking genera, mostly exotic.

Before proceeding to another plate of quadrupeds, a short space will be appropriately given to a few

General Remarks on the Characters of Animals.

On this subject it cannot come within the scope of this journal to go into extremely minute particulars in painting the characters of *every* species, even of all the larger animals. A few general remarks from a celebrated work on the Philosophy of Natural History, will, however, form a suitable accompaniment of the present number.

On every animal, says Smellie, Nature has imprinted a certain character, which is indelibly fixed, and distinguishes the species. This character we discover by the actions, the air, the countenance, the movements, and the whole external appearance. The courage of the lion, the ferocity of the tiger, the voraciousness of the wolf, the pride of the courser, the dullness and indolence of the ass, the cunning and address of the fox, the affection and docility of the dog, the subtilty and selfishness of the cat, the mildness of the sheep, the timidity of the hare, the vivacity of the squirrel, are proper examples. These characters, when under the influence of domestication, may be moderated by education, of which rewards and punishments are the chief instruments employed. But the original character impressed by the hand of nature, is never fully obliterated. Those animals which seem to be destined by nature to live in perpetual slavery under the dominion of man, have the mildest and most gentle dispositions. It is pleasant, but at the same time somewhat contemptible, to see a troop of oxen guided by the whip of a child.

In the human species, the variety of tempers, affections, aversions, and studies, is indispensably necessary for supporting the social state, and carrying on the general business of life. Some minds are formed for study and deep research, and others for action, courage, and the exertion of bodily powers. The same variety in the dispositions and manners of the different tribes of animals is equally necessary for peopling the earth, and for supplying the reciprocal exigencies of its inhabitants.

Beside the general specific characters of animals, individual characters, especially among the human race, are strongly marked and greatly variegated. In every government, and particularly in commercial states, human characters, independently of the original bias, or genius, stamped by nature on individual minds, are often so disguised by a thousand artifices, that it requires not only time, but frequent interesting scenes, before a man can discover the real character even of an intimate companion. Many men associate together in the most harmonious manner, and show every symptom of friendship and attachment; but when any of them happens to be distressed, or to require aid, all this apparent friendship instantly vanishes; the aspect of the countenance, instead of exhibiting sympathy and cordiality, is converted into a cold reserve, and the unfortunate former companion is first shunned and then deserted. This picture of human nature, we are sorry to remark, is too general; but, thank Heaven, it is not universal; for there always were, and still are, men of noble and generous minds, who willingly sacrifice part of their own interest to that of their friends.

With regard to the characters of quadrupeds, beside the specific dispositions which distinguish the different kinds, each individual possesses a peculiar character by which it may be discriminated from any other. These individual characters may be discovered not only by the aspect, but by the actions, of animals. Some dogs, even of the same race, are surly, churlish, and revengeful; others are gay, frolicsome, and friendly. The countenances of men, which always indicate some part of their original and genuine character, are as various as their numbers. Though less subject to general observation, Nature has marked the countenance of every animal, even down to the insect tribes, with some characteristic strokes, which enable them to distinguish one another, and even to contract particular attachments. To us, the small birds, such as sparrows and linnets, appear to be so perfectly similar, that though we had an opportunity of seeing great numbers of them collected in one place, it would require much time and attention to be enabled to make individual distinctions. After they have brought up their young, they associate promiscuously in flocks; but, when the genial spring arrives, a different scene is exhibited. The flocks disappear. Each male has selected, courted, and retired with a female to build a nest, to hatch eggs, to nourish and support their young. If nature has not stamped on every individual a peculiar mark, it would be impossible that the immense multitudes who pair, or join in matrimony, should be capable of distinguishing and adhering faithfully to one another. A shepherd who has been long accustomed to superintend a numerous flock, knows by the countenances, and other natural or accidental marks, every individual. I know, continues Smellie, a shepherd, who not only distinguished every individual of above two hundred sheep, but gave to each a particular name.

The characters of quadrupeds, and even of some birds, are indicated by obscure resemblances between the lineaments of their faces and those of men of different features and dispositions. Some men, in the general expression of their countenances, resemble goats, others sheep, others oxen, others swine, others dogs, others foxes, others owls, others hawks. Even in particular races of the same species, similarities of this kind may be traced. I know some men who resemble terriers, others greyhounds, others spaniels, others the shepherd-dog, others the lap-dog, &c. Some of these resemblances may be regarded as fanciful, and perhaps they frequently are. But in general, when the resemblance to a particular animal is strongly marked in the human countenance, the dispositions of the man have a striking affinity to those of the animal. Men who resemble the fox are uniformly cunning and deceitful. Those who resemble the ox are dull, stupid, and phlegmatic. It is needless to multiply examples. Every man's recollection and observation will furnish him with numberless coincidences between the similarity in structure and feature to particular animals, and the form, disposition, and manners of the men who possess them.

Comparisons have been instituted, and analogies traced, between the structure, aspect, and disposition, of some quadrupeds and those of certain birds, which show a uniformity in the general plan of nature. Among birds as well as quadrupeds, some species are carnivorous, and others feed on fruits, grain, and various kinds of herbage. The eagle, which is a noble and generous bird, represents the lion. The vulture, which is cruel and insatiable, represents the tiger. The kite, the buzzard, and the raven, who live chiefly on offals and carrion, represent the hyena, the wolf, and the jackal. The falcon, the sparrow-hawk, and other birds employed in hunting, represent the dog, the fox, the lynx, &c. The owl, who searches for her prey in the night, represents the cat. The heron and the cormorant, who feed upon fishes, represent the beaver and the otter. Peacocks, hens, and all other birds which have a crop, or craw, represent oxen, sheep, goats, and other ruminating animals.

PLATE XXI.—QUADRUPEDS.

Lion, Lioness, and Young. Felis leo, LINN. CUV.

The lion must be regarded as the first and most important species of carnivorous animals. His superior bodily powers, and predatory habits, place him at the head of beasts of prey, and render him the tyrant of his native plains and forests. He is the "king of the beasts" in physical strength, which, vulgarly allied to the notion of moral power and excellence, has led to the erroneous impression that he is noble and brave. The lion is not free from cowardice and cunning, but he is cruel only when under the pressing influence of hunger.

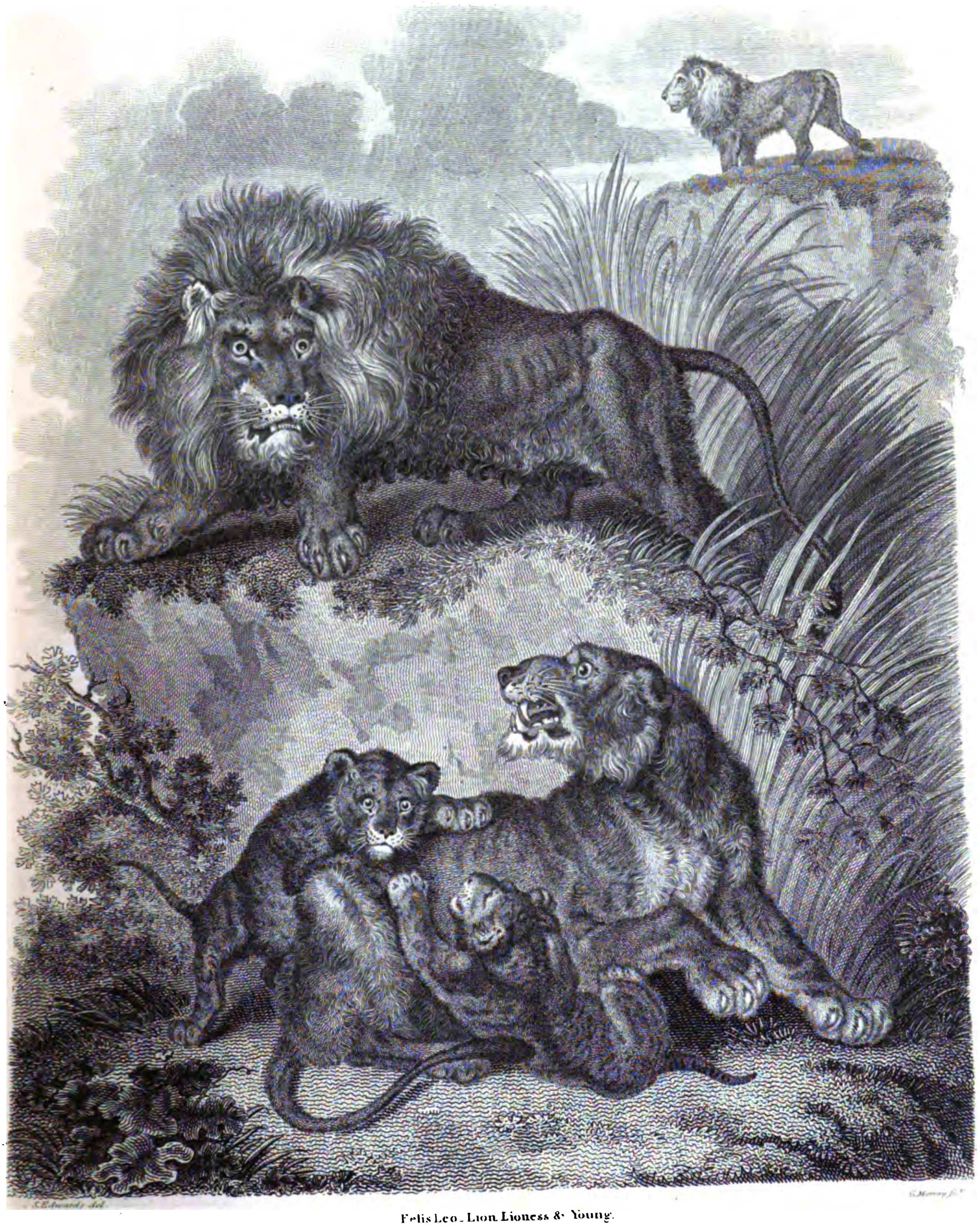
The lion is a native of the warmer regions of the old world. Africa, with its extensive deserts and untrodden forests, is peculiarly his scene of action; yet even there the progress of human encroachment is perpetually circumscribing the limits of his empire, and in Asia they are now comparatively rare. Indeed, to use the words of Cuvier, "the species has disappeared from a great number of places where it was formerly found, and it has diminished in an extraordinary degree everywhere."

The peculiar habits of the lion are explained by the anatomical structure of the organs of taste, vision, and touch. The tongue may be considered as a prehensile lacerating organ, rather than an organ of taste, an exquisite sense of which was unnecessary to an animal whose food is always the same; hence the nerve of taste, as demonstrated by Desmoulins, is extremely small. Being chiefly an organ of mastication, the tongue of the lion, as in all animals of the cat kind, has its upper surface covered with sharp and strong points, inclining backwards, which tear the flesh, open new channels for the blood, and direct the food into the fauces. He sees "in the dark," to use a common expression; few places, however, are so dark that some rays of light may not be found,—these are strongly concentrated in the eye, and are reflected in a brilliant concave mirror, at the bottom of that organ, called the tapetum. He hunts principally by night.

The organs of touch are the moustaches, or whiskers, which are attached to a bed of close glands under the skin; and each of these long and stiff hairs is connected with the nerves of the lip, thus indicating any obstacle which may present itself to the passage of the body through confined places, and thus securing a stealthy motion. The hearing of the lion, too, is very perfect. The perception of smell is less than in the dog tribe.

QUADRUPEDS.

GENUS FELIS. LIONS. TYGERS &c.



S. Edwards del.

G. Murray sc.

Felis Leo. Lion Lioness & Young.

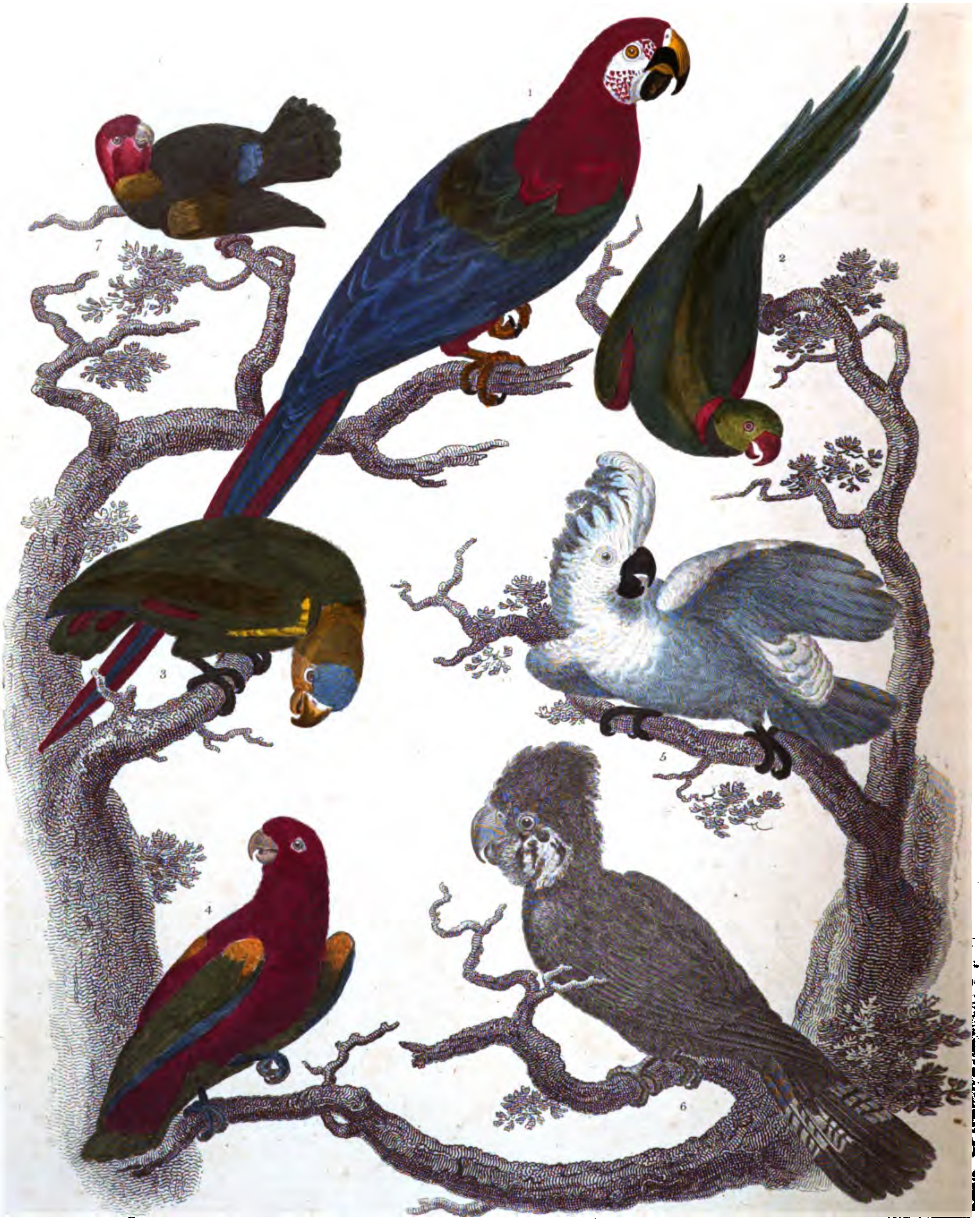
ORNITHOLOGY.

Div^{n}. 1st Land Birds _ Order 2d PICÆ.

Linn Syſt.

PLATE 22.

Order Picæ.



GENUS *PSITTACUS*.

(Parrot)

Syd. Edwards del.

1.P. *Macao* — 2.P. *Alexandri* — 3.P. *Æstivus var* — 4.P. *Garrulus var* — 5.P. *Moluccensis* — 6.P. *Banksii* — 7.P. *Pullarius*.

The roar of the lion is terrific; from the larynx, or upper part of the windpipe, composed of five cartilages, being proportionally greater than in any other animal. It is described by travellers on some occasions to resemble an earthquake, produced by the animal laying his head upon the ground, and uttering a half-stifled roar, or growl.

The lion advances by leaps, and springs upon his prey; his motions are sudden and prompt, but of short continuance. He tears his prey by the conjoined action of his teeth and claws; pressing the animal to the ground, and tearing it to pieces by the powerful motions of his neck, the muscles employed in which are the largest in the body.

Cuvier characterizes the lion externally as "a large yellow cat, with tufted tail, the neck of the adult male furnished with a thick mane." The young, when first born, are very small in proportion to their adult size, and do not arrive at maturity for about five years. Its average life is supposed, by Buffon, to be twenty-five years, though it has been kept in confinement for nearly three times that period. When very young, and in confinement, it has been known to exhibit marks of tameness and affection towards its feeder, and one has recently been exhibited in this city, which allowed great liberties to be taken with its mouth, paws, &c. This tameness is not, however, to be trusted, since the natural ferocity of some has been proved to be never entirely subdued. Lions which have been sometimes familiar, have on other occasions been known to kill their keepers, and dart at those who have incautiously approached the cage.

The attachment of the lion for dogs is recorded in many interesting traits. St. Pierre touchingly describes the lion of Versailles, who lived most happily with a dog, on whose death he became disconsolate and miserable.

PLATE XXII.—ORNITHOLOGY.

Parrots. Genus Psittacus, *Linnæus.*

Fig. 1. *Scarlet Maccaw. Psittacus macao*, Linn. *Ara macao*, Cuv.

The scarlet Maccaw, by far the most magnificent of the Parrot tribe, is a native of South America and some of the larger West Indian islands, where it resides in woods, and feeds, like the rest of this vast and splendid genus of birds, on various kinds of fruit.

"This bird," says Edwards, who has furnished in his work the best figure extant, "is the largest of all the kinds I have met with. When the tail is perfect, I have found some of them to measure more than thirty-six inches from bill-point to tail-end. The bill is great and strong; the tongue roundish and soft; the head, neck, breast, belly, thighs, upper part of the back, and lesser covert-feathers of the wings, are of a very fine bright red or scarlet colour; the quill-feathers of the wings are of a very fine blue on their outsides, and a faint red underneath; the first feathers next above the quills are of a fine yellow colour, some being tipped with green; the blue quills which fall next the back are tinged with green; the hinder part of the thigh has some green intermixed with red; the lower belly, and coverts of the tail, as also the lower part of the back, and coverts on the upper side of the tail, are of a very fine blue colour; some of the longest, or middle feathers, are wholly red; the shorter, or side feathers, are partly red and partly blue; the legs and feet are covered with blackish or dusky scales; the toes are disposed two forwards and two backwards, as in other parrots, all armed with strong claws."

This noble bird was formerly considered, in Europe, as a present fit for royalty, and was one of the principal ornaments in the halls of palaces.

The manners of this species are well detailed by the Count de Buffon. They live in the woods that cover swampy grounds, generally appear in pairs, and but seldom in flocks. Of all the parrot tribe, they fly the best, perching always on the summits or highest branch of trees. They build in the holes of old trees, which they enlarge if too narrow, and line the inside with feathers. They have two hatches annually, like all the other American parrots, and each consists of two eggs, of the size of a pigeon's. The males and females sit alternately, or cherish the young, and both equally carry the food. The young are easily tamed. They may be taught to speak a few words, but their articulation is hoarse and unpleasant, much resembling a piercing scream. In a state of captivity, like many other birds, they are subject to epileptic fits, which however do not prevent them from arriving at a very considerable age, sometimes not less than thirty years. For an account of the tribes of parrots, see Shaw's Zoology.

Fig. 2. *Green Parakeet. Psittacus Alexandri*, Linn. *Palæornis Alexandri*, Cuv.

This elegant species, which has so long maintained a distinguished reputation for its docility and imitative powers, is supposed to have been the only bird of the parrot kind known to the Greeks and Romans. Among the latter nation, they were in great request; they lodged them in superb cages, ornamented with silver, tortoise-shell, and ivory; and the price of a parrot often exceeded that of a slave.

The size of the Alexandrine parrot is that of a common pigeon; its length about fifteen inches, and its colour an elegant bright green above, paler or yellower beneath; across each shoulder, on the smaller coverts, is a lengthened purplish red patch or spot; and from the base of the lower mandible, on each side, proceeds a moderately broad black band or stripe, which passes backwards so as almost to encircle the neck, the back part marked with a red collar near half an inch wide; the back part of the head has a slight bluish tinge, and the edges of the tail-feathers are often of a similar cast; the bill is of a bright orange red; the legs ash coloured; and the under surface of the tail is yellowish.

Fig. 3. *Psittacus æstivus*, Linn. Cuv.

Fig. 4. *Psittacus garrulus*, Linn. *Lorius garrulus*, Cuv.

Fig. 5. *Psittacus moluccensis*, Linn. *Plyctolophus moluccensis*, Cuv.

Fig. 6. *Banksian Cockatoo. Psittacus banksii*, Linn. *Calyptorhynchus banksii*, Cuv.

The Banksian Cockatoo is a native of New Holland, where it was discovered during the first circumnavigation of Captain Cook. Its size is that of the scarlet maccaw, and its length about twenty-two inches. Its colour is black, more or less varied or spotted about the shoulders, front, and under parts of the body, with yellowish spots; the head is furnished with a moderately large crest, and the tail is bright scarlet, all the feathers, except the two middle ones, being crossed by numerous black bars; the bill is very large, of a yellowish horn colour, and the legs black.

Fig. 7. *Psittacus pullarius*, Linn. *Psittacula pullaria*, Cuv.

The public have lately been favored with some anecdotes of parrots from a new book called "Gardiner's Music of Nature," but we are not aware that the following has been published in this country.

"In modern times, we have heard of no bird of this genus that rivals the celebrated parrot so many years in the possession of the late Colonel O'Kelly. The following particulars, politely communicated by Sir Henry Englefield, bart., afford a convincing proof of the memory and docility sometimes exemplified in the present race of parrots.

"Colonel O'Kelly's parrot was of a beautiful green colour, and had, I think, a spot of red on each shoulder. I saw him in company with eight or ten other strangers. At first the bird seemed alarmed at the number of people, and was quite sullen. The housekeeper was sent for, and she gradually brought him into good humour by caressing him, talking and singing to him. The first tune he sung was *The Banks of the Dee.* He sung several verses of this by snatches, pausing between whiles as if his memory failed him. The maid then helped him by going on where he left off, and then he took her up, not repeating what she had sung, but going on from her last words. He pronounced the words of the song very distinctly, much more so, indeed, than when he spoke, for his articulation in speaking was not remarkably clear. The tone of his singing was very odd. It seemed like an automaton imitating a human voice; but the intonation was very good; and had he been taught by a good singer instead of a kitchen-maid, I have no doubt that he would have sung very agreeably. The maid prompted him to sing *God save the King.* He sang all the verses of it, but every now and then wandered back into *The Banks of the Dee,* which seemed his favourite. Afterwards he sung the *hundredth Psalm,* and one or two Scotch songs, the names of which I forget. I think in the whole he sung six different songs, all with words to them. He did not sing them all entirely through, but seemed as if he could have done it, had he been quite in good humour. Colonel O'Kelly told us that he knew about twenty songs, and from what I saw and heard I can readily believe it. Ices and cakes were brought to the company. A teaspoon with cream ice in it was given to the bird. He took it in one foot, standing on his perch on the other, held it up to his bill and supped it up gently, looking round and talking at intervals to the company, in a most singular manner, and with an air of intelligence quite surprising. While thus employed, somebody pushed him with a finger; he turned quickly round, and said in an angry tone, *Don't throw me down.* Colonel O'Kelly told us that his power of catching sounds was quite astonishing: that when a newspaper had been read aloud in his presence, the colonel, on coming into the room half an hour after, had, as he opened the door, been convinced by the sound, that the same person was still reading aloud, and had been scarce able to believe it was the parrot repeating to himself articulate sounds precisely in the tone and manner of the reader. He also delighted in imitating the puppet-shows that exhibited in the streets. This is all I can very distinctly remember of this very extraordinary bird."

PLATE XXIII.—ORNITHOLOGY.

Fig. 1. *Common Partridge. Tetrao perdrix,* Linn. *Perdrix cinereus,* Cuv.

This well known and elegant bird is generally about thirteen inches in length. A minute description of the marks of the feathers is deemed unnecessary. The partridge varies greatly, several varieties being recorded by different authors. They are found throughout nearly the whole of Europe.

They pair about the end of February. The female lays her eggs, from fifteen to eighteen in number, in a rude nest of dry leaves and grass formed on the ground. The period of incubation is three weeks; and so closely do the females sit on their eggs when near hatching, that one has been taken with her nest and its precious contents, and carried in a hat to some distance, where she continued to sit in confinement, and brought out her young. The young brood run about as soon as they are hatched, even, according to the farmer's boy, with the shells on their backs; both parents are equally anxious for their preservation, and lead them immediately to ant-hills, on the pupæ of which insects they feed principally at first. The young flock together in broods, called coveys, till spring, when they separate and pair. Their principal food consists of seeds, insects, and berries. It is a common thing to place the eggs beneath the domestic hen, who hatches and rears them as her own: in this case the young birds require to be fed with the larvæ of ants, and well supplied with fresh water. It is also recommended to give them wood-lice, and occasionally fresh curds, mixed with lettuce or chickweed.

The affection of partridges for their offspring is very interesting. Both the parents lead them out to feed, point out to them the proper places, and assist them in finding it by scratching the ground with their feet, frequently covering them with their wings, like the hen. Their eggs are frequently destroyed by weasels, foxes, &c.; when this has been the case, the female frequently forms another nest, and lays afresh; but the produce of such hatchings are always a puny race, seldom surviving the rigours of winter.

It is common to have tame partridges in the farm-yard; and we have seen an instance where a pair were so domesticated, that they brought forth several successive broods in a basket in the entry of the house. It is stated by Willoughby, that a man in Sussex, England, had made a covey of them so tame, that for a wager he drove them before him from the country to London, though they were quite free, and had their wings grown. When raised with a brood of chickens, they come and feed as regularly as their foster brothers.

Fig. 2. *Hackled Partridge. Tetrao? ferrugineus,* Latham.

Latham and Sonnerat vary somewhat in their description of this bird. Its native place is the eastern part of Asia, and of its habits nothing is known.

Fig. 3. *Gibraltar three-toed Quail. Tetrao Gibraltaricus,* Linn. *Turnix Gibraltaricus,* Cuv.

This is a rare species, having only three toes, all placed forwards. It inhabits the countries on the African coast of the Mediterranean, and occasionally visits the southern shores of Spain.

Fig. 4. *Maryland, or Quail of the United States. Tetrao Marylandicus,* Linn. *Cœlinus Virginianus,* Cuv.

The quails are very nearly allied to the partridge, differing only in being smaller, and having a more delicate beak, shorter tail, and no spur on the legs. The quail of Europe is universally spread over the old world, and deemed excellent food, though rejected by the ancients as unwholesome; their flesh is more delicate and juicy than that of the partridge. The American quail belongs to the sub-genus Ortyx, distinguished from the former by having a larger, shorter, and more arched bill, and peculiar to America, where it is found from New-England to Honduras. In contradistinction to the European quail, which is a bird of passage, our own has very strong local attachments, and is found in the same neighbourhood at all seasons. The female constructs her nest on the ground near a tuft of grass, in May; the materials are leaves and dry grass. She lays from fifteen to twenty perfectly white eggs. Wilson is of opinion, that the common idea that quails occasionally lay in each other's nests, is correct. About the first of October, they prepare for winter, and to enter on what is termed their *running* season, when they are to be met with in swamps and thickets, instead of the open fields, where the "Bob White" had been previously heard. The food of the quail is composed of grain, seeds, insects, &c., but their favourite food is Indian corn. Like the rest of the gallinaceous tribe, the quails fly with a loud whirring sound, occasioned by the shortness of their wings, and the rapidity with which they move them. They often suffer from the inclemency of our winters, whole coveys being found frozen.

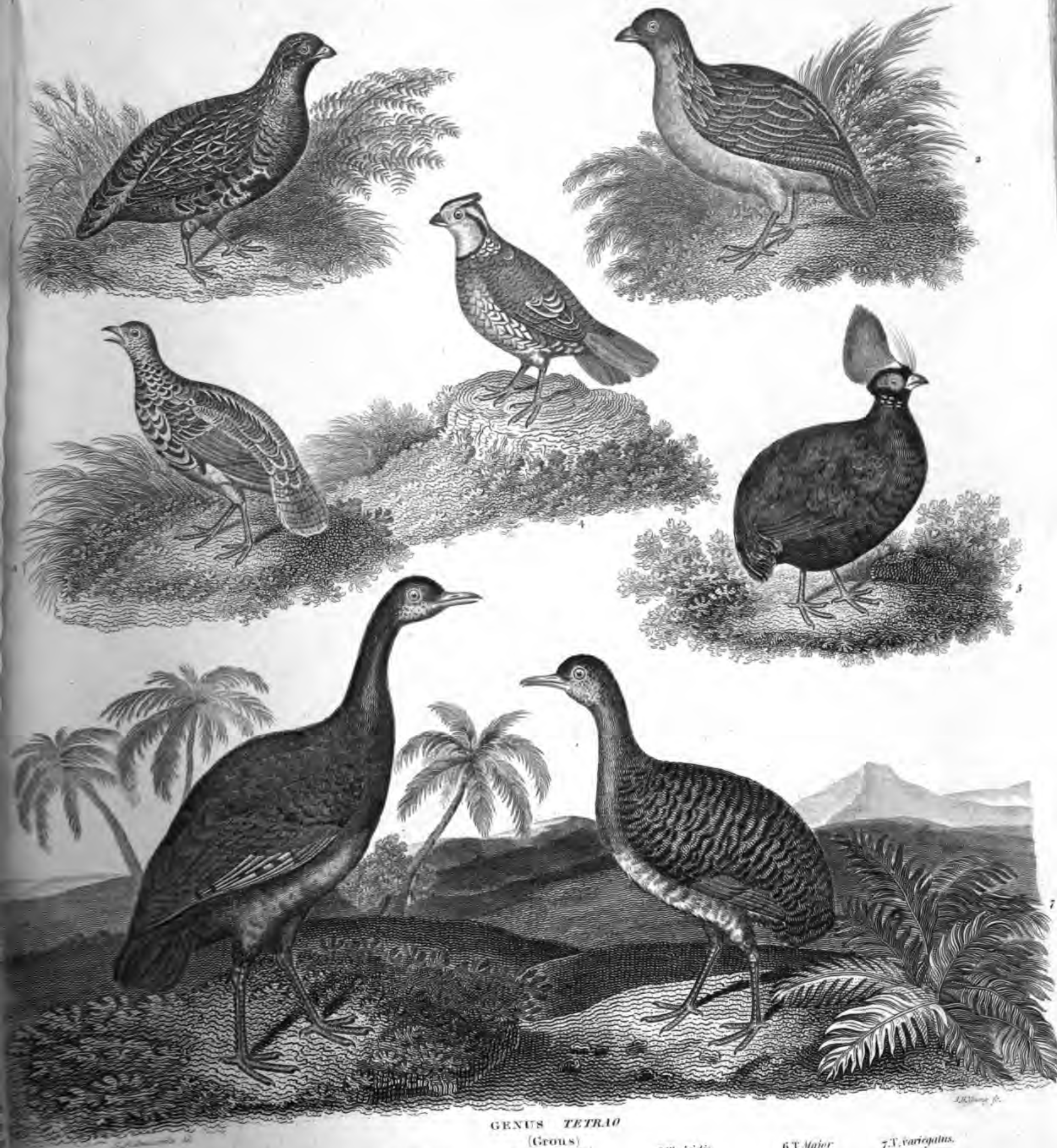
The American quail is about nine inches long and fourteen in extent, weighing from seven to eight ounces. The bill is black; line over the eye, down the neck and whole chin, pure white, bordered by a band of black, descending and forming a crescent on the throat; the eye is a dark hazel; crown, neck,

Linn. Syst.

ORNITHOLOGY.

PLATE 23.

Div. 2d Land Birds Order GALLINÆ.



GENUS TETRAO

(Grous)

1. T. Perdix
COM: PARTRIDGE

2. T. ferrugineus
HACKLED P.

3. T. Gibraltaricus
GIBRALTAR 3 TOED QUAIL

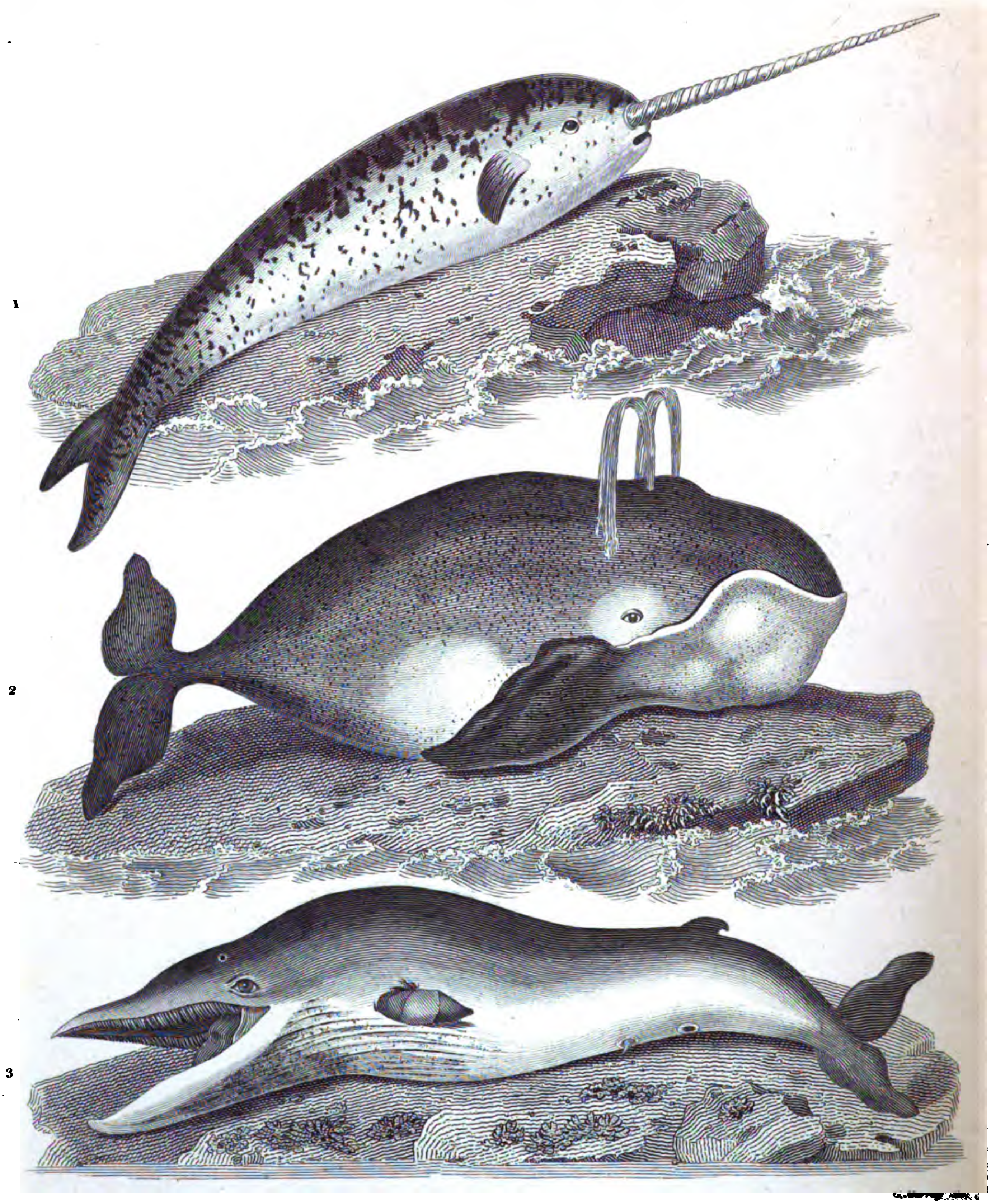
4. T. Marylandus
MARYLAND Q.

5. T. viridis
GREEN Q. Male

6. T. Major
GREAT TINAMOU

7. T. variegatus.
VARIEGATED T.

CLASS MAMMALIA. *ORDER* CETE. GENUS MONODON. NARWHAL. GENUS BALÆNA. MYSTICETUS. *PLATE* 24.



1. M. Monoceros. Unicorn N. 2. B. Mysticetus Great M. or Common Whale. — 3. B. Boops. Pike-headed M.

and upper part of the breast, red brown; sides of the neck spotted with white and black on a reddish brown ground; back, scapulars, and lesser coverts, red brown, mixed with ash, and minutely marked with black; wings plain and dusky; lower part of the breast and belly whitish, marked with black arrow-heads; tail ash, spotted with reddish brown. (See *Wilson, Ornithol.* Vol. VI., and *Nuttall, Ornithol.* 647.)

Fig. 5. *Green Quail. Tetrao viridis*, Linn. *Cryptomix cristatus*, Cuv.

Both sexes possess six long bristles at the base of the beak, which the bird can elevate or depress at will. The male, as represented in the plate, is distinguished by having a fine tuft of long feathers on the head, forming a movable diadem, the feathers of which are a chesnut red. Much of the plumage being green, the name of Green Quail has been given to it. It is common in Malacca, Sumatra, and Java. It will not bear confinement, and is very wild.

Fig. 6. *Great Tinamou. Tetrao major*, Linn. *Tinamus major*, Cuv.

The genus *Tinamus* are all natives of South America, and are very dull birds.

This species inhabits the great forests of French Guiana and Cayenne, and roosts upon the lower branches of trees. The flesh and eggs are esteemed a great dainty.

Fig. 7. *Variegated Tinamou. Tetrao variegatus*, Linn. *Tinamus variegatus*, Cuv.

This beautiful species is twelve inches in length, and is distinguished from all others by the length of its beak, and the shortness of its tail. It inhabits Guiana. The female lays ten or twelve eggs of a lilac hue.

PLATE XXIV.—MAMMALIA.

Fig. 1. *Unicorn Narwhal. Monodon monoceros*, Linn. and Cuv.

The generic characters of the Narwhal are—form of the body similar to the dolphin; a single spiracle, or blow-hole, on the superior part of the head; mouth small; no teeth within the mouth, one long spiral tusk growing from the intermaxillary bone; dorsal crest or spine, instead of a fin; the eyes and ears small.

The Narwhal is an inhabitant of the arctic seas, and consequently is seldom seen, except by the adventurous mariners in search of the whale. The most remarkable peculiarity of this animal is its small spiral tooth or tusk, growing from one side of its head, and sometimes nine or ten feet long, from which it has obtained the name of Unicorn. It projects from the upper jaw, being parallel in direction to the roof of the mouth, is spirally striated from left to right, nearly straight, and tapers to a round blunt point. It is of a yellowish white colour, and consists of a compact kind of ivory, hollow from the base to near its point. Two or three instances have been known of male narwhals having been taken, which had two external tusks; and they all have another on the opposite side of the head embedded in the skull, but not often appearing externally. He feeds on molluscous animals, &c., is of a harmless disposition, and swims with swiftness. The body is covered by a layer of blubber immediately beneath the skin, which is from two to three inches thick, and yields a considerable quantity of fine oil. The Esquimaux eat the flesh, and burn the oil; the intestines are wrought into lines and dresses, and the tusks are even used for spears, &c. It is said that the king of Denmark has a magnificent throne made entirely of narwhal tusks. A fine specimen of the horn, or tusk, may be seen in the Philadelphia Museum.

Fig. 2. *Great* or *Common Whale. Balæna mysticetus*, Linn. and Cuv.

This valuable and interesting animal, generally called *the* whale by way of eminence, is the object of our most important commerce to the polar seas, is productive of more oil than any other of the cetacea, and being less active, slower in motion, and more timid than any other of the kind of nearly similar magnitude, is more easily captured.

Generic Characters. Whales possess no teeth; the upper jaw resembles the keel of a vessel, or the roof of a house reversed; it is furnished on each side with transverse horny layers, of a peculiar substance, called *baleen*, or whalebone, which at the edges are split into long slender fringes. The spiracles, or blow-holes, are separated, and placed about the middle of the superior part of the head. Some species of the whale have a dorsal fin, others merely a prominence.

Most of the valuable information respecting this leviathan is derived from Captain Scoresby, from whose interesting works the following account has been abridged.

Of 332 individuals, in the capture of which I have been personally engaged, says that author, no one, I believe, exceeded 60 feet in length, and the largest I ever measured was 58 feet from one extremity to the other. The longest actual measurement gives 67 feet, but this is uncommon. Sixty feet is therefore the size of the largest; its greatest circumference from 30 to 40 feet. It is thickest a little behind the fins, from whence it tapers towards the head and tail. Its form is cylindrical, the head somewhat of a triangular shape. The lips, extending 15 or 20 feet in length, and five or six in height, and forming the cavity of the mouth, are attached to the under jaw, and rise from the jaw-bones at an angle of about eighty degrees. The upper jaw is bent down at the extremity, so as to shut the front and upper parts of the cavity of the mouth, and is overlapped by the lips at the sides. When the mouth is open, it presents a cavity as large as a room, and capable of containing a merchant-ship's jolly-boat, full of men, being six or eight feet wide, ten or twelve feet high in front, and fifteen or sixteen feet long.

The two fins are placed two feet behind the angle of the mouth; they are from seven to nine feet in length, and four or five in breadth. The articulation being spherical, the fins are capable of motion in any direction, but from the tension of the flesh and skin below, cannot be raised above the horizontal position. The whale has no dorsal fin. The tail, comprising in a single surface 80 or 100 square feet, is a formidable instrument of motion and defence. Its length is only five or six feet, but its width is from 18 to 26 feet, has a horizontal position, is flat and semi-lunar, indented in the middle, the two lobes somewhat pointed, and turned a little backward. Its motions are rapid and universal; its strength immense.

The eyes, like those of the elephant, are remarkably small for the bulk of the animal's body, being little larger than those of an ox; they are situated in the sides of the head, about a foot, obliquely, above and behind the angle of the mouth. The whale has no external ear, nor can any orifice for the admission of sound be discovered until the skin is removed. On the most elevated part of the head, about sixteen feet below the anterior extremity of the jaw, are situated two blow-holes, or spiracles, consisting of two longitudinal apertures, six or eight inches in length. These are the proper nostrils of the whale; a moist vapour, mixed with mucus, is discharged from them when the animal breathes; but no water accompanies it unless an expiration of the breath be made under the surface.

The mouth, in place of teeth, contains two extensive rows of fins or whalebone, which are suspended from the sides of the crown bone. These series of fins are generally curved longitudinally, although they are sometimes straight, and give an arched form to the roof of the mouth. They are covered immediately by the lips attached to the lower jaw, and inclose the tongue between their lower extremities; each series, or "side of bone," as the whale-fishers term it, consists of upwards of 300 laminæ;[*] the longest are near the middle, from whence they gradually diminish away at each extremity; fifteen feet is the greatest length of the whalebone, but ten or eleven feet is the average size, and thirteen feet is a magnitude seldom met with. The greatest breadth, which is at the gum, is ten or twelve inches. The laminæ composing the two series of bone, are ranged side by side two-thirds of an inch apart, (thickness of the blade included,) and resemble a frame of screws in a saw-mill; the interior edges are covered with a fringe of hair, and the exterior edges of every blade, excepting a few at each extremity of the series, is curved and flattened down, so as to present a smooth surface to the lips. In some whales a curious hollow on one side, and a ridge on the other, occurs in many of the central blades of the whalebone, at regular intervals of six or seven inches. May not this irregularity, like the rings in the horn of the ox, which they resemble, afford an intimation of the age of the whale? If so, twice the number of running feet in the longest lamina of the whalebone, in the head of a whale not full grown, would represent its age in years. In the youngest whales, called suckers, the whalebone is only a few inches long; when the length reaches six feet or upwards, the whale is said to be *size*. The colour of the whalebone is brownish-black or bluish-black. In some animals it is striped longitudinally with white. When newly cleaned, the surface exhibits a fine play of colours. A large whale sometimes affords a ton and a half of whalebone. If the "sample blade," that is, the largest lamina in the series, weigh seven pounds, the whole may be estimated at a ton; and so on in proportion. The whalebone is inserted into the crown-bone in a sort of rabbit. All the blades in the same series are connected together by the gum, in which the thickest ends are inserted. This substance (the gums) is white, fibrous, tender, and tasteless; it cuts like cheese. It has the appearance of the interior or kernel of the cocoa-nut. The tongue occupies a large portion of the cavity of the mouth; and the arch formed by the whalebone is capable of protrusion, being fixed from root to lip to the fat extending between the jaw-bones.

A slight beard, consisting of a few short scattered white hairs, surmounts the anterior extremity of both jaws.

The throat is remarkably straight.

Two paps in the female afford the means of rearing the young. They are situated on the abdomen, one on each side of the pudendum, and are two feet apart. They appear not to be capable of protrusion beyond the length of a few inches. In the dead animal they are always found retracted.

The milk of a whale resembles that of a quadruped in appearance. It is said to be rich and well flavoured. The vent is about six inches behind the pudendum in the female, but in the male it is further back.

The colour of the mysticetus is velvet-black, gray (composed of dots of a blackish-brown on a white ground), and white, with a tinge of yellow. The back, most of the upper jaw, and part of the lower jaw, together with the fins and tail, are black. The tongue, the lower part of the under jaw, and lips, sometimes a little of the upper jaw at the extremity, and a portion of the belly, are white; and the eye-lids, and the junction of the tail with the body, a portion in the axillæ of the fins, &c. are gray. The skin of the body is slightly furrowed like the water-lines on coarse laid paper. On the tail, fins, &c. it is smooth. Immediately beneath the skin lies the blubber, or fat, encompassing the whole body of the animal, together with the fins and tail. Its colour is yellowish-white, yellow, or red. In the very young animal it is always yellowish-white. In some old animals, it resembles in colour the substance of the salmon. It swims in water. Its thickness all around the body is eight or ten or twenty inches, varying in different parts as well as in different individuals. The lips are composed almost entirely of blubber, and yield from one to two tons of pure oil each. The tongue is chiefly composed of a soft kind of fat that affords less oil than any other blubber; in the centre of the tongue, and towards the root, the fat is intermixed with fibres of a muscular substance. The under jaw, excepting the two jaw-bones, consists almost wholly of fat, and the crown-bone possesses a considerable coating of it; the fins are principally blubber, tendons, and bones; and the tail possesses a thin stratum of blubber. The oil appears to be retained in the blubber in minute cells connected together by a strong reticulated combination of tendinous fibres. These fibres being condensed at the surface, appear to form the substance of the skin. The oil is expelled when heated, and in a great measure discharges itself out of the *henks* whenever putrefaction in the fibrous parts of the blubber takes place. The blubber and the whalebone are the parts of the whale to which the attention of the fisher is directed. The flesh and bones, excepting occasionally the jaw-bone, are rejected. The blubber, in its fresh state, is without any unpleasant smell, and it is not until after the termination of the voyage, when the cargo is unstowed, that a Greenland ship becomes disagreeable.

Four tons of blubber, by measure, generally afford three tons of oil; but the blubber of a sucker contains a very small portion. Whales have been caught that have afforded nearly thirty tons of pure oil; and whales yielding twenty tons are by no means numerous. The quantity of oil yielded by a whale generally bears a certain proportion to the length of its longest blade of whalebone.

A stout whale of sixty feet in length is of the enormous weight of seventy tons: the blubber weighs about thirty tons; the bones of the head, whalebone, fins, and tail, eight or ten; carcase thirty or thirty-two.

The flesh of the young whale is of a red colour, and when cleared of fat, broiled, and seasoned with salt and pepper, does not eat unlike coarse beef; that of the old whale approaches to black, and is exceedingly coarse.

Most of the bones of the whale are very porous, and contain large quantities of exceedingly fine oil. The jaw-bones, which measure twenty to twenty-five feet in length, are often taken care of, principally on account of the oil that drains out of them when they come into a warm climate. When exhausted of oil, they readily swim in water.

The whale has no external ear, and the opening of the passage to this organ is so small as not to be easily discovered. In the sucking whale it was only one-sixth of an inch in diameter. An elegant contrivance appears in the maetus auditorius externus for protecting the ear against pressure from without. It consists of a little plug like the end of the finger, inserted into a corresponding cavity, in the midst of the canal, by a slight motion of which the opening can either be effectually shut for the exclusion of sea-water, or opened for the admission of sound.

The largest animal of this species may be safely stated at a hundred tons in weight; and an ordinary full-grown animal, as above stated, at seventy tons.

As the whale must rise to the surface of the sea to breathe, its tail is placed horizontally, to enable it to ascend and descend more quickly; and its nostrils, or blow-holes, instead of being placed at the snout, are generally on the most elevated part of the head, that they may be readily lifted clear of the water.

When the whale descends to the depths of the ocean, it becomes exposed to an enormous pressure from the superincumbent water. This pressure is sufficient to force the water through the pores of the hardest wood; yet it is effectually resisted by the skin of the whale, though it is remarkably soft and flexible. To exclude the water from the lungs, which would occasion suffocation if admitted, the blow-holes are

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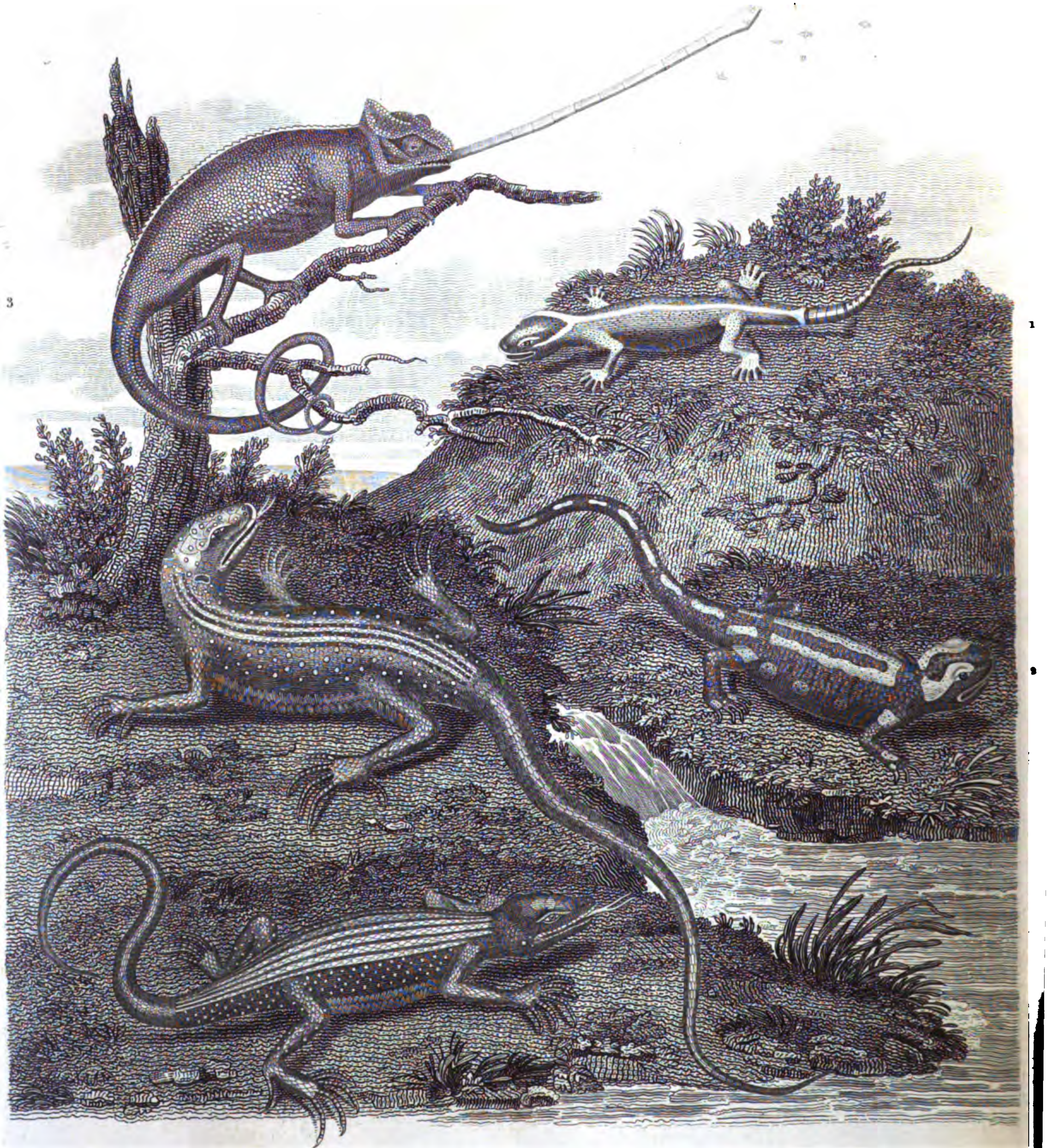
[*] In a very small whale, the number was 316 or 320

AMPHIBIA.

GENUS. *LACERTA*.



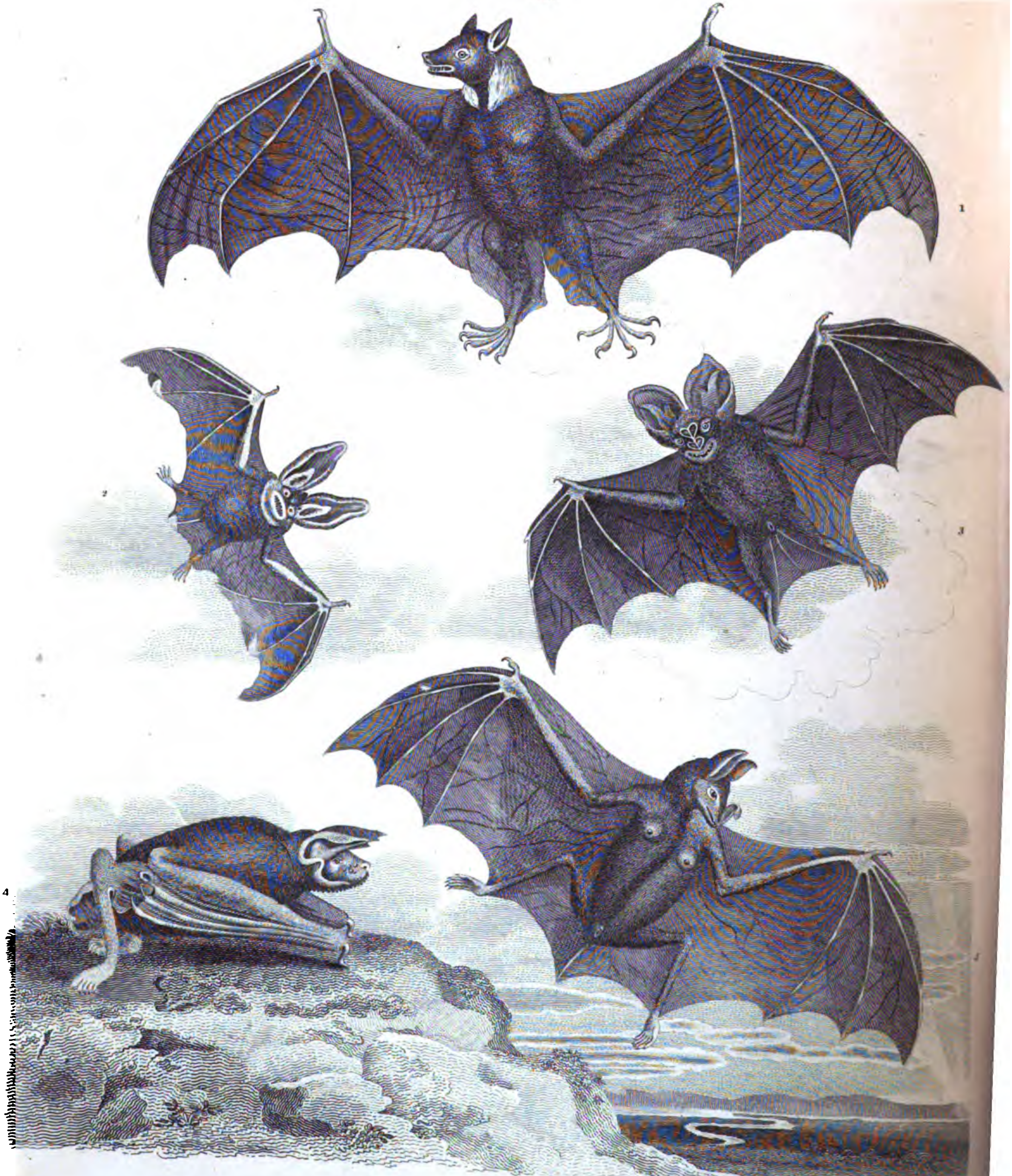
1.Platydactylus vittatus 2.Salamandra maculosa 3.Chameleo Africanus 4.Ameiva 5.Ameiva lemniscata.

FORKED L. SPOTTED L. CHAMELEON LACERTA LEMNISCATA.

MAMMALIA.

Linn. Syst. GENUS VESPERTILIO PLATE 26.

(Bat)



1. V. Vampyrus *VAMPYRE B.* 2. V. Auritus *LONG EARED B.* 3. V. Spasma *CORDATED B.* 4. V. Leporinus *PERUVIAN B.* 5. V. Spectrum *SPECTRE B.*

defended by the peculiar valves that have been already described.

Its sense of seeing is acute: whales are observed to discover one another, in clear water, when under the surface, at an amazing distance. When at the surface, however, they do not see far.

They have no voice; but in breathing, or blowing, they make a very loud noise. The vapour they discharge is ejected to the height of some yards, and appears at a distance like a puff of smoke. When the animal is wounded, it is often stained with blood; and on the approach of death, jets of blood are sometimes discharged alone. They blow strongest, densest, and loudest, when "running." When in a state of alarm, or when they first appear at the surface after being a long time down, they respire, or blow, four or five times a minute.

Bulky as the whale is, and inactive, or indeed clumsy as it appears to be, one might imagine that all its motions would be sluggish, and its greatest exertions productive of but little celerity. The fact, however, is the reverse. A whale extended motionless at the surface of the sea can sink in the space of five or six seconds, or less, beyond the reach of its human enemies. Its velocity along the surface, or perpendicularly, or obliquely downwards, is the same. The usual rate at which whales swim, however, even when they are on their passage from one situation to another, seldom exceeds four miles an hour; and though when urged by the sight of any enemy, or alarmed by the stroke of a harpoon, their extreme velocity may be at the rate of eight or nine miles an hour; yet we find this speed never continues longer than for a few minutes before it relaxes to almost one half; hence, for the space of a few minutes they are capable of darting through the water with the velocity almost of the fastest ship under sail, and of ascending with such rapidity as to leap entirely out of the water. This feat they sometimes perform as an amusement apparently, to the high admiration of the distant spectators, but the no small terror of the inexperienced fishers, who even under such circumstances are often ordered by the foolhardy harpooner to "pull away" to the attack. Sometimes the whales throw themselves into a perpendicular posture, with their heads downwards, and rearing their tails on high in the air, beat the water with awful violence.

In their usual conduct, whales remain at the surface to breathe about two minutes, seldom longer; during which time they blow eight or nine times, and then descend for an interval usually of five or ten minutes; but sometimes, when feeding, of fifteen or twenty. They have been known to descend to the depth of an English mile, and with such velocity, that instances have occurred in which whales have been drawn up by the line attached from a depth of 700 or 800 fathoms, and have been found to have broken their jaw-bones, and sometimes their crown-bone, by the blow struck against the bottom.

The food of the whale consists of various species of actiniæ, eliones, sepiæ, medusæ, caneri, and helices; or at least some of these genera are always to be seen wherever any tribe of whales is found stationary and feeding. In the dead animals, however, in the very few instances in which I have been able to open their stomachs, squillæ, or shrimps, were the only substances discovered. In the mouth of a whale just killed, I once found specimens of the same insect.

When the whale feeds, it swims with considerable velocity below the surface of the sea, with its jaws widely extended. A stream of water consequently enters its capacious mouth, and along with it large quantities of water insects; the water escapes again at the sides, but the food is entangled, and sifted, as it were, by the whalebone, which, from its compact arrangement, and the thick internal covering of hair, does not allow a particle, the size of the smallest grain, to escape.

The whale has one young at a birth. Instances of two being seen with a female are very rare. The young one, at the time of parturition, is said to be at least ten if not fifteen feet in length. It goes under the protection of its mother for probably a year or more, or until, by the evolution of the whalebone, it is enabled to procure its own nourishment.

Whales doubtless live to a great age.

The maternal affection of the whale, which in other respects is apparently a stupid animal, is striking and interesting; the cub, being insensible to danger, is easily harpooned, when the tender attachment of the mother is so manifested as not unfrequently to bring her within the reach of the whalers. Hence, though a cub is of little value, seldom producing above a ton of oil, and often less, it is sometimes struck as a snare for its mother.

Whales are viviparous. They have but one young at a time, and suckle it with teats. They are furnished with lungs, and are under the necessity of approaching the surface of the water at intervals to respire in the air. The heart has two ventricles and two auricles. The blood is warmer than in the human species: in a narwhal that had been an hour and a half dead, the temperature of the blood was 97°, and in a mysticetus recently killed, 102°. All of them inhabit the sea. Some of them procure their food by means of a kind of sieve, composed of two fringes of whalebone; these have no teeth; others have no whalebone, but are furnished with teeth. They have all two lateral, or pectoral fins, with concealed bones like those of a hand, and a large, flexible, horizontal tail, which is the principal member of motion. Some have a kind of dorsal fin, which is an adipose or cartilaginous substance, without motion. This fin, varying in form, size, and position, in different species, and being in a conspicuous situation, is well adapted for a specific distinction. The appearance and dimensions of the whalebone and teeth, especially the former, are other specific characteristics. All whales have spiracles, or blow-holes—some with one, others with two openings, through which they breathe. Some have a smooth skin all over the body; others have rugæ or sulsi about the region of the thorax and on the lower jaw. And all afford, beneath the integuments, a quantity of fat or blubber, from whence a useful and valuable oil, the train-oil of commerce, is extracted.

Fig. 3. *Pike-headed Whale. Balæna boops. Balænaptera boops*, Cuv.

Length about 46 feet; greatest circumference of the body, 20 feet; dorsal protuberance, or fin, 2½ feet; pectoral fin, four or five feet long; tail, three feet deep and ten broad; whalebone, about 300 laminæ on each side, the longest about 18 inches in length; the jaws about 15 feet long; two external blow-holes; blubber on the body, two or three inches thick.

PLATE XXV.—AMPHIBIA.

Fig. 1. *Forked Lizard. Platydactylus vittatus*, Cuv.

Fig. 2. *Spotted Lizard. Salamandra maculosa*, Cuv.

Fig. 3. *Chameleon. Lacerta chameleon*, Linn. *Chameleo Africanus*, Cuv.

Fig. 4. *Ameiva* .... Cuv.

Fig. 5. *Lacerta lemniscata*, Linn. *Ameiva lemniscata*, Cuv.

PLATE XXVI.—MAMMALIA.

Fig. 1. *Vespertilio vampyrus*, Linn. *Pteropus rubicollis*, Cuv.

Fig. 2. *Vespertilio auritus*, Linn. *Plecotus auritus*, Cuv.

Fig. 3. *Vespertilio spasma*, Linn. *Megaderma spasma*, Cuv.

Fig. 4. *Vespertilio leporinus*, Linn. *Noctilio leporinus*, Cuv.

Fig. 5. *Vespertilio spectrum*, Linn. *Phyllostoma spectrum*, Cuv.

Bats form an order of mammiferous quadrupeds, characterized by having the tegumentary membrane extended over the bones of the extremities so as to constitute wings capable of sustaining and conveying them through the air. They have therefore received the name of ***Cheiroptera***, or hand-winged. The order comprises a great number of genera, species, and varieties, of extraordinary appearance. All the bats are either purely insectivorous, or insectifrugiverous, having exceedingly sharp, cutting, and acutely tuberculated jaw teeth; and the whole race is nocturnal. During the daytime they remain suspended by their hooked hinder claws, in the lofts of barns, in hollow trees, caves, &c. In the celebrated Mammoth Cave of Kentucky, millions congregate during the winter, and are seen in clusters as far from the mouth as ten miles. In such retreats they remain in a torpid condition until spring recalls them to active life.

Bats enjoy the senses of hearing and sight to a considerable degree of perfection; but the acuteness of their sense of touch is unequalled. By means of the great expansion of integument forming the delicate membrane of the wings, ears, and nasal appendages, bats are able, even when deprived of their eyes, to fly in such a manner as to avoid silk threads, sticks, &c. placed across the course of flight, without touching them. These soft, velvet-like wings enable them to fly without noise, and to advance with great swiftness. From the suspended posture they readily take wing by relinquishing their hold; the hook at the extremity of the fore-arm corresponds in situation to the human thumb. A recent writer suggests, that as the common bat is infested with bed-bugs, they are the means of introducing these vermin into our dwellings. A single bat, taken from a buttonwood-tree, had a sufficient number of bugs to have supplied a whole neighbourhood. Bats generally bring forth two young, of which they are very tenacious. While suckling, they remain closely attached to the mother's teats, which are two, situated upon the chest. The voice of the small bats, when irritated, is a sharp, chattering sort of squeak. They bite with great force. The stories generally current respecting the vampyre bat, fig. 1., sucking human blood to any extent, are now discarded by naturalists.

PLATE XXVII.—CONCHOLOGY.

Fig. 1. ***Murex muricatus***, Linn. Lam.
Fig. 2. ***Murex kaustellum***, Linn. Lam.
Fig. 3. ***Murex longicaudus***, Linn. ***Fusus longioaudus***, Lam.
Fig. 4. ***Trochus niloticus***, Linn. Lam.
Fig. 5, 6. ***Trochus perspectivus***, Linn. ***Solarium perspectivum***, Lam.
Fig. 7. ***Murex tulipa***, Linn. ***Fasciolaria tulipa***, Lam.
Fig. 8. ***Trochus turritus***, Linn. ***Cerithium*** Lam.
Fig. 9. ***Turbo pictus***, Lam.

PLATE XXVIII.—BOTANY.

In a former number we gave the names and characters of twelve of the Linnæan classes of plants; the annexed plate illustrates the remaining twelve classes, respecting which we shall add a few explanatory remarks.

13. ***Polyandria***, has above twenty stamina, inserted into the receptacle.
14. ***Didynamia***, has four stamina, two of them uniformly shorter than the other two.
15. ***Tetradynamia***, six stamina, two of which are uniformly shorter than the rest.
16. ***Monodelphia***, the stamina united into one body by the filaments.
17. ***Diadelphia***, the stamina united into two fasciculi by the filaments.
18. ***Polyadelphia***, the stamina united into three or more fasciculi by the filaments.
19. ***Syngenesia***, the stamina united in a cylindrical form by the antheræ.
20. ***Gynandria***, the stamina inserted into the pistillum.
21. ***Monoecia***, male and female flowers in the same plant.
22. ***Dioecia***, male plants in one flower, and females in another of the same species.
23. ***Polygamia***, male, female, and mixed flowers in the same species.
24. ***Cryptogamia***, the flowers invisible, so that they cannot be ranked according to the parts of fructification.

These twenty-four classes of Linnæus embrace every known genus and species. It is an easy matter to class a plant belonging to any of the first eleven classes, as they all depend upon the number of stamina, without regard to other circumstances; only it is to be observed that the eleventh class, ***Dodecandria***, although its title implies but twelve stamina, includes such plants as are furnished with any number of stamina from eleven to nineteen inclusive. The reason of the chasm in the classes from ten to twenty stamina, is, that no flowers had been found with only eleven, so as to form a class. The twelfth class requires more attention than the preceding. When the stamina are more than twenty, a tyro will be apt to imagine that the plant belongs to the class Polyandria. In referring plants of this kind to their classes, particular attention must be paid to the insertion of the stamina. If they are inserted into the ***calyx***, or cup, the class belongs to ***Icosandria;*** if into the base, or receptacle of the flower, it belongs to ***Polyandria***. This is an important distinction, because plants of the latter class are often poisonous.

The fourteenth class is likewise in danger of being confounded with the fourth; but in the former, two of the stamina are shorter than the other two.

The fifteenth and sixth consist of an equal number of stamina; but in the former, four of the stamina are uniformly longer than the other two.

Such are the ***classes*** in the celebrated system of Linnæus. We design on a future occasion to give some illustrations of the ***orders*** and ***genera***.

PLATE XXIX.—ENTOMOLOGY.

White Ant. Termite. Termes Bellicosa, Linn.

Smeathman has given the best account of the habits and instincts of these curious insects; and they are so singular that they cannot fail to be interesting to the reader. Whole volumes have been written respecting the various tribes of ants, and the curious reader is referred to those of Huber and Satreille, where he will find examples of an industry that has become proverbial, and traits of affection and feeling that would do honour to our own species. Love and courage, patience and perseverance, almost all the higher virtues of human nature, seem to be the ordinary springs of action in the ant.

The termites are represented by Linnæus as the greatest plagues of both Indies; and, indeed, between the tropics they are justly so considered, from the vast damages and losses which they cause. They perforate and eat into wooden buildings, utensils, and furniture, with all kinds of household stuff, and merchandise; these they totally destroy, if their progress be not timely stopped. A person residing in the equinoctial

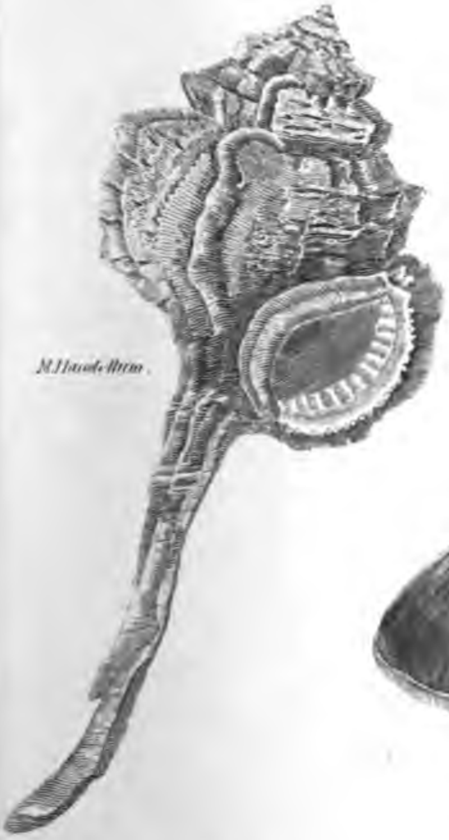
Linn. Syst.

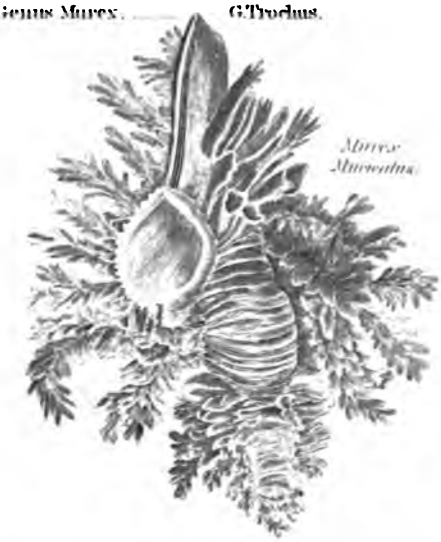
CONCHOLOGY.

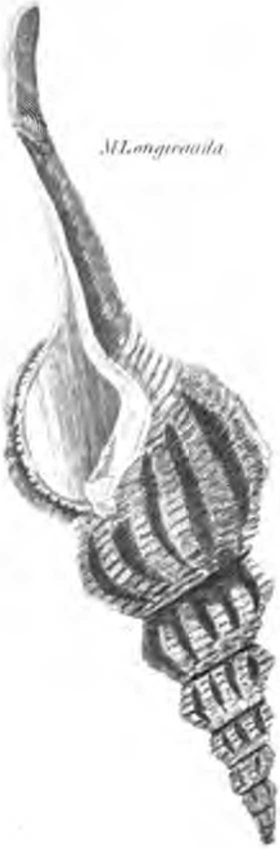
PLATE 27.

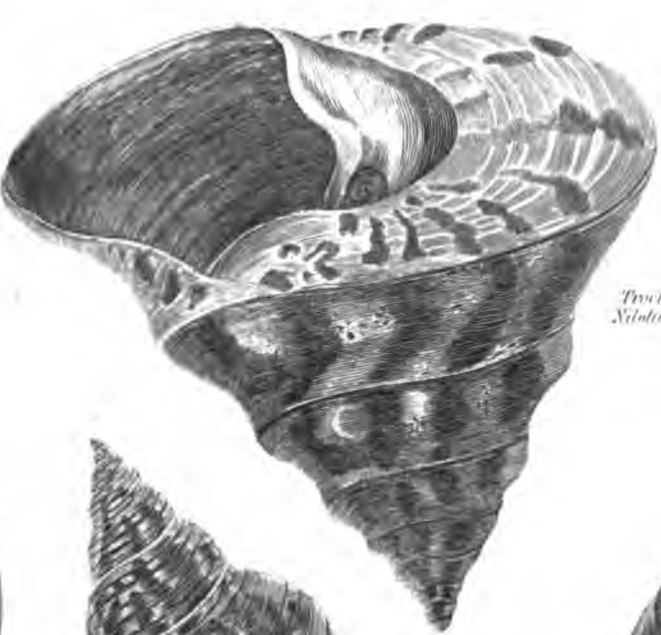
ORDER UNIVALVE.

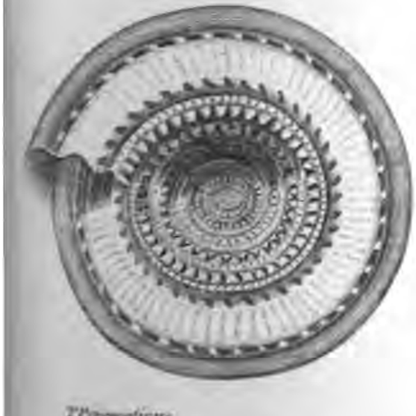
Genus Murex. —— G.Trochus.

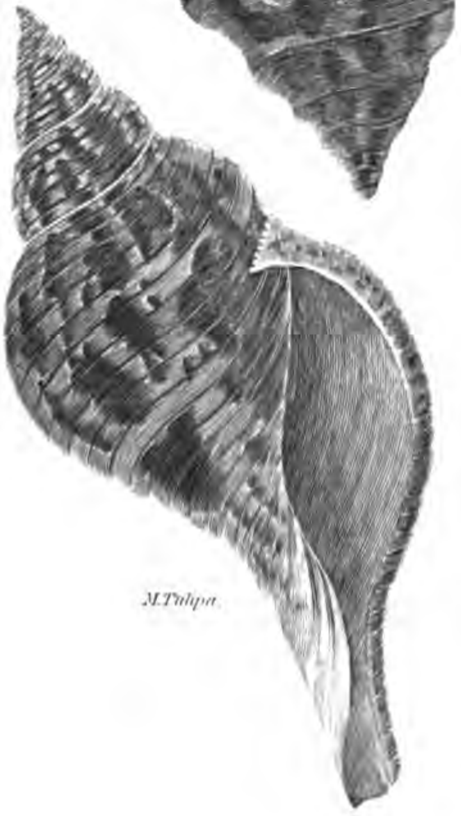

M.Haustellum.

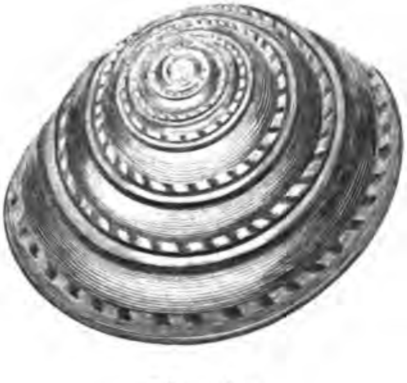

Murex Muricatus.

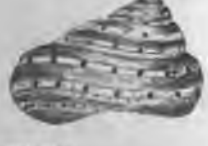

M.Longicauda.

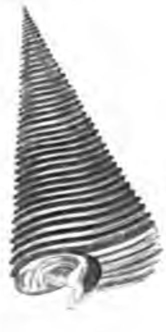

Trochus Niloticus.


T.Perspectivus.


M.Tulipa.


T.Perspectivus.

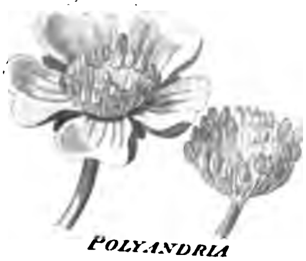

T.Pictus.


T.Turritus.

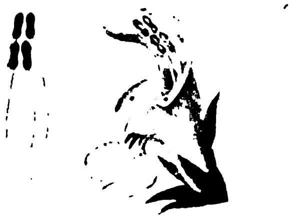
[illegible]

BOTANY.

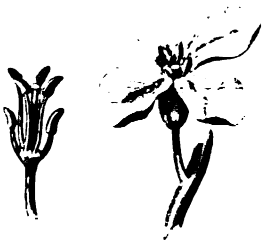
Classes.



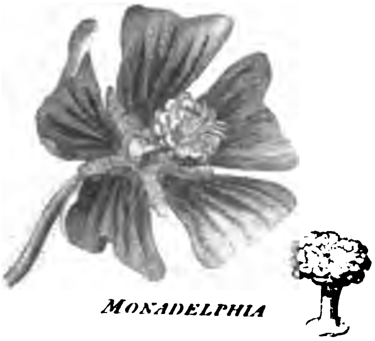
POLYANDRIA



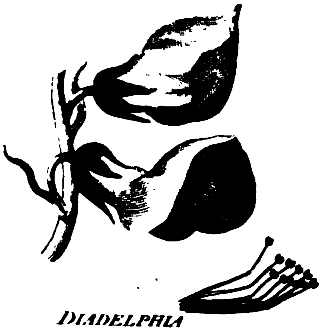
DIDYNAMIA



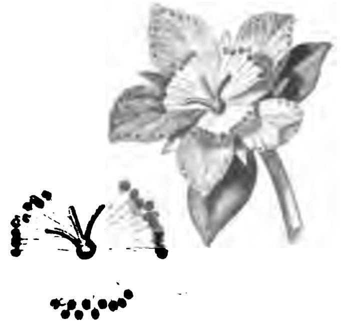
TETRADYNAMIA



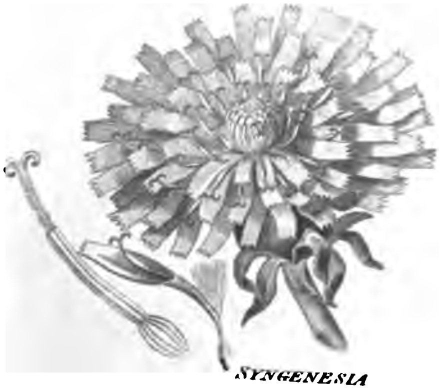
MONADELPHIA



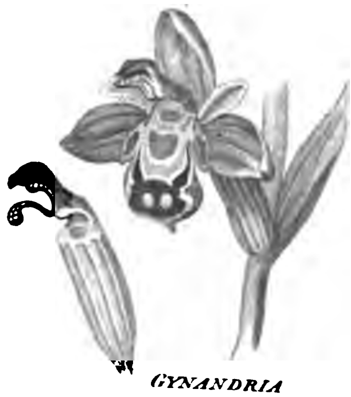
DIADELPHIA



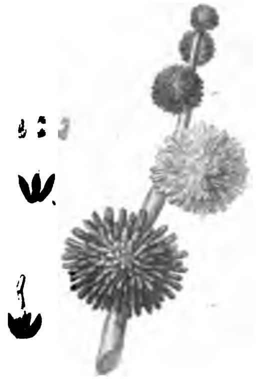
POLYADELPHIA



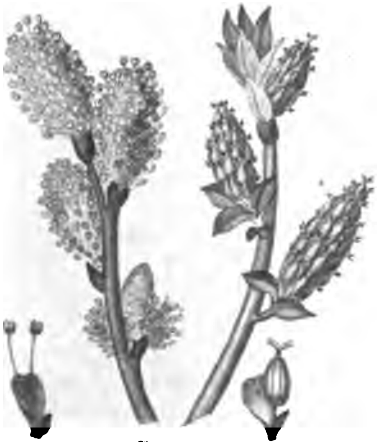
SYNGENESIA



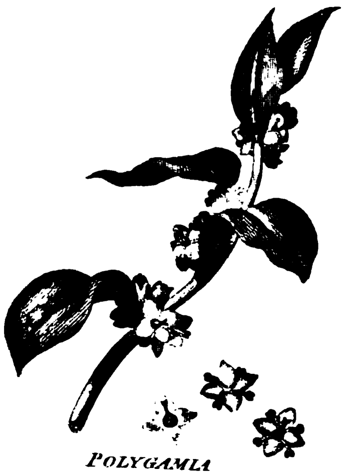
GYNANDRIA



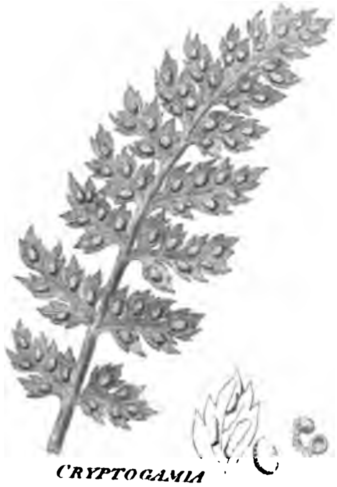
MONOECIA



DIOECIA



POLYGAMIA



CRYPTOGAMIA

G. Murray Sc.

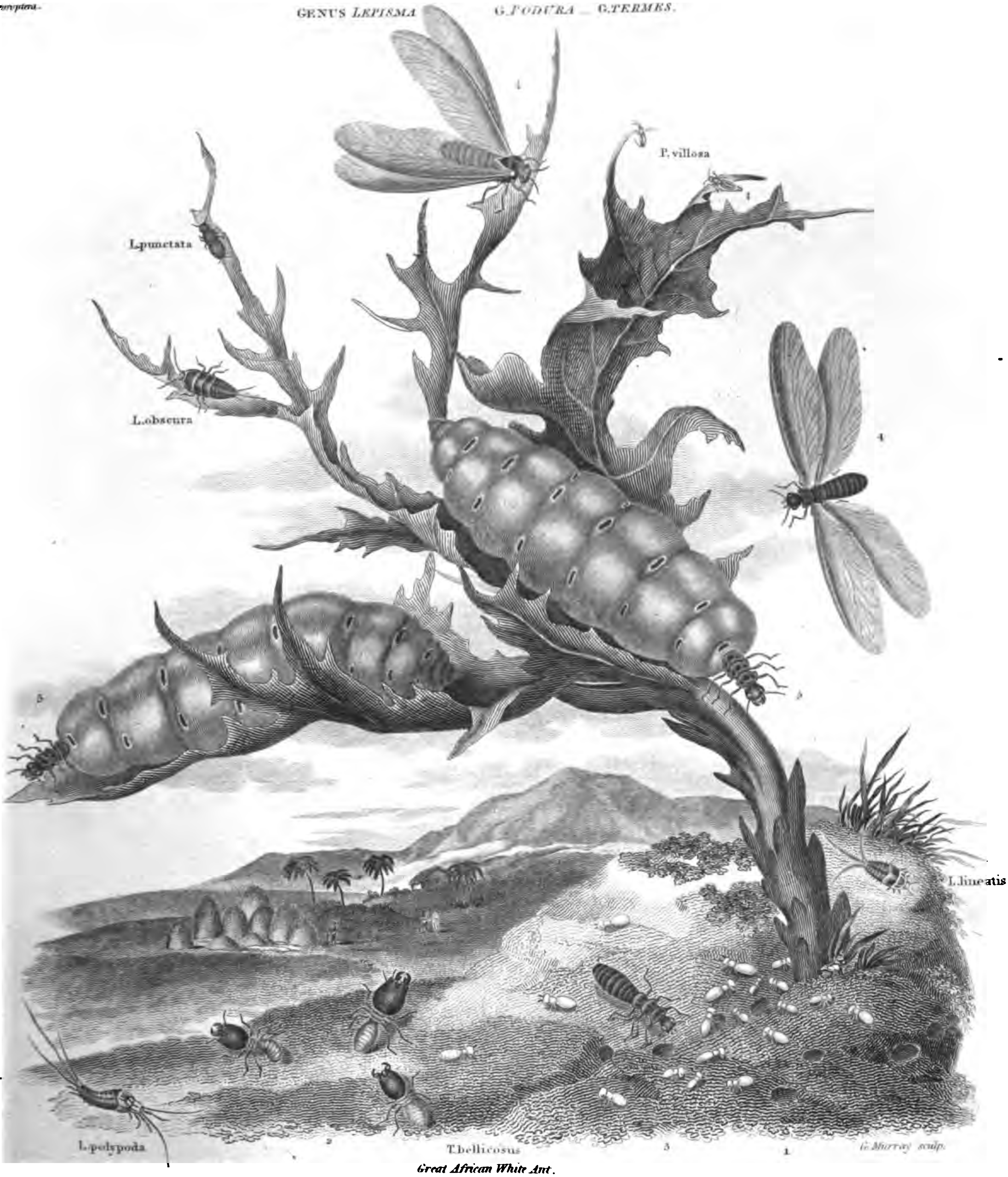
Linn. Syft.
O. Aptera.
O. Neuroptera.

ENTOMOLOGY.

Order Aptera.

PLATE 29.
of Aptera.

GENUS *LEPISMA* G. *PODURA* _ G. *TERMES*.



Great African White Ant.

1.Labourers _ 2.Soldiers _ 3.King 4.Male _ 5.Pregnant Female *or* Queen _ 6.Nests. ‡ *under surface*.

regions, although not incited by curiosity, must be very fortunate if the safety of his property do not compel him to observe their habits.

"When they find their way," says Kirby, "into houses or warehouses, nothing less hard than metal or glass escapes their ravages. Their favourite food, however, is wood; and so infinite is the multitude of assailants, and such the excellence of their tools, that all the timber-work of a spacious apartment is often destroyed by them in a night. Outwardly, every thing appears as if untouched; for these wary depredators—and this is what constitutes the greatest singularity of their history—carry on all their operations by sap or mine, destroying first the inside of solid substances, and scarcely ever attacking their outside, until first they have concealed it and their operations with a coat of clay."

An engineer, having returned from surveying the country, left his trunk on a table; the next morning he found not only all his clothes destroyed by white ants, or cutters, but his papers also, and the latter in such a manner, that there was not a bit left of an inch square. The black lead of his pencils was consumed; the clothes were not entirely cut to pieces and carried away, but appeared as if moth-eaten, there being scarcely a piece as large as a shilling that was free from small holes; and it was further remarkable, that some silver coin, which was in the trunk, had a number of black specks on it, caused by something so corrosive that they could not be rubbed off, even with the hand. "One night," says Kemper, "in a few hours, they pierced one foot of the table, and having in that manner ascended, carried their arch across it, and then down, through the middle of the other foot, into the floor, as good luck would have it without doing any damage to the papers left."

The destructiveness of these insects is, perhaps, one of the most efficient means of checking the pernicious luxuriance of vegetation within the tropics; no large animal could effect in months what the white ant can execute in weeks; the largest trees, which falling, would rot, and render the air pestilential, are so thoroughly removed, that not a grain of their substance is to be recognized. Not only is the air freed from this corrupting matter, but the plants destroyed by the shade of these bulky giants of the vegetable world, are thus permitted to shoot.

The different species of this genus resemble each other in form, in their manner of living, and in their good and bad qualities, but differ as much as birds in the manner of building their habitations, and in the choice of the material of which they compose them.

Some build on the surface of the ground, or partly above and partly beneath, and some on the stems or branches of trees, sometimes aloft at a vast height.

Their societies consist of five different descriptions of individuals.

Workers, or larvæ, answering to the neuters of bees. These constitute the most numerous division of the community; they construct the nest, and take charge of the young until the latter are capable of providing for themselves.

Nymphs, or pupæ: which differ in nothing from the larvæ, except in possessing the rudiments of wings.

Neuters: which are known by their large heads, armed with very long mandibles. These exceed the labourers much in bulk, and are in numerical proportion to the latter as 1 to 100. They are the soldiers of the community.

A male and female arrived at their full state of perfection. Each community contains but one of each of these, and they are strictly king and queen; they are exempt from all the ordinary duties falling upon their subjects. When first disclosed from the pupa, they have four wings; but like the ants, they soon cast off these members. They are known from the blind larvæ, pupæ, and neuters, by their having two large eyes.

"In this form," says Smeathman, "the animal comes abroad during or soon after the first tornado, which at the latter end of the dry season proclaims the approach of the ensuing rains, and seldom waits for a second or third shower, if the first, as is generally the case, happen in the night and bring much wet with it.

"The quantities that are to be found next morning all over the surface of the earth, but particularly in the waters, is astonishing.

"On the following morning, however, they are to be seen running upon the ground in chase of each other. From one of the most active, industrious, and rapacious; from one of the most fierce and implacable little animals in the world, they are now become the most innocent, helpless, and cowardly; never making the least resistance to the smallest ant."

The ants are to be seen on every side in infinite numbers, dragging to their different nests these annual victims of the laws of nature. It is wonderful that a pair should ever escape so many dangers, and get into a place of safety; some, however, do in fact escape, and being found by some of the labouring insects that are continually running about the surface of the ground under their covered galleries, they are elected kings and queens of new states. All those who have not the good luck to be so preserved, certainly perish, and most probably in the course of the following day.

The little industrious creatures immediately inclose the favoured individuals in a small chamber of clay, suitable to their size, into which at first they have but one entrance, just large enough for the workers and the soldiers to go in and out.

About this time, a most extraordinary change begins to take place in the queen, to which nothing similar is known except in the chigoe, and in the different species of the coccus tribe. The abdomen begins gradually to enlarge, and at length acquires such an enormous size, that an old queen will have it increased to an extent which equals fifteen hundred or two thousand times the bulk of the rest of her body, and twenty or thirty thousand times the bulk of a labourer.

The skin between the segments is distended in every direction; and at last the segments are removed to the distance of half an inch from each other, though at first the length of the whole abdomen is not half an inch: they preserve their dark brown colour, and the upper part of the abdomen is marked with a regular series of brown bars from the thorax to the posterior part of the abdomen; while the intervals between them are covered with a thin, delicate, transparent skin, and appear of a fine cream colour, a little shaded by the dark hue of the intestines and watery fluid seen here and there beneath.

The abdomen is then of an irregular oblong shape, being contracted by the muscles of every segment, and is become one vast matrix full of eggs, which make long circumvolutions through an innumerable series of very minute vessels. This singular matrix is not more remarkable for its amazing extension than for its peristaltic motion, which resembles the undulation of the waves, and continues incessantly without any apparent effort on the part of the animal; so that there is a constant protrusion of eggs, to the amount, as Smeathman has frequently counted in the case of an old queen, of sixty in a minute, or eighty thousand and upwards in twenty-four hours.

These eggs are instantly removed by her attendants, of which a sufficient number is always found waiting in the adjacent chambers, and carried to the nurseries, which, in a great nest, may be four or five feet distant, in a direct line, and consequently much farther by the winding galleries which conduct to them.

The nests of these insects are usually termed hills by natives, as well as strangers, from their outward appearance, which being more or less conical, generally resemble the form of a sugar-loaf; they rise about ten or twelve feet in perpendicular height above the ordinary surface of the ground.

One inch of the terme's building, being proportionate to twenty-four feet of human building, twelve inches, or one foot, of the former must be proportionate to twelve times twenty-four, or two hundred and eighty-eight feet, of the latter; consequently, when the white ant has built one foot, it has, in point of labour, equalled the exertions of a man who has built two-hundred and eighty-eight feet: but, as the ant-hills are ten feet high, it is evident that human beings must produce a work of two thousand eight hundred and eighty feet in height, to compete with the industry of their brother insect. The great pyramid is about one-fifth of this height; and as the solid contents of the ant-hill are in the same proportion, they must equally surpass the solid contents of that ancient wonder of the world. These hills are sufficiently strong to support the weight of a large bull, to whom they furnish a convenient stand for watching the rest of the herd ruminating below.

There are also around large subterranean galleries, to which the Roman sewers are not to be compared, when the size of the worker is taken into account. Some of these are thirteen inches in the bore, extending more than a hundred yards under ground, and forming the great thoroughfares of the community. The tender bodies of the termites, compared with the armour-like integument of their mortal enemies, makes it necessary for them thus to conceal themselves.

Fig. 1, represents the labourers, less than a quarter of an inch in length. When its formidable jaws are examined, and its immense industry and activity are considered, the effects resulting from the labours of myriads of these insects will scarcely excite surprise.

Fig. 2, are the soldiers, with the huge head armed with awls.

Fig. 3, the king, which after losing its wings never increases in bulk.

Fig. 4, the males.

Fig. 5, pregnant females, or queens, represented on branches, to show their entire figures.

Fig. 6, nests.

On attempting to knock off the top of one of these nests, a soldier will run out, and walk about as if to reconnoitre; he is followed by two or three others, and to them succeed a large body, who rush out as fast as the breach will permit them. It is not easy, says Smeathman, to describe the rage and fury they show; being blind, they bite everything they come against, making a crackling noise. They make their hooked jaws meet at every bite; and if it should be on the leg of a man, a spot of blood, extending an inch on the stocking, follows the wound. Nothing can tear them away, and they must be taken off piecemeal. The same author saw an army of the marching ants, *Termes viarum*, emerge from the ground, and observed their motions. Their march was orderly, and very rapid, and their numbers prodigious. They were divided into two columns, sixteen abreast, composed chiefly of labourers, with here and there a huge soldier, that appeared like an ox among sheep; other soldiers kept a foot or two from the column, acting as videttes, appointed to guard against a surprise; others mounted the plants or blades of grass, which flanked the main bodies, and thus elevated a foot or more, looked over and controlled the proceedings of the moving multitude. They turned their heads in the different directions where danger might arise, and every now and then struck their forceps against the plant, producing a ticking sound, to which the whole army answered simultaneously with a loud hiss, and quickened their pace. The stream continued to flow on for an hour, and then sunk into the earth; the rear was brought up by a large body of soldiers.

As the termites have a portion of their community expressly set apart for the duties of war, they may be expected to exhibit the most perfect form of insect tactics; and such, indeed, is the fact. Upon an alarm being given, the labourers, being incapable of fighting, betake themselves to the interior, while the soldiers take their places. A sentinel starts out, walks rapidly about, and after ascertaining the nature of the danger threatened, retires to give the alarm. Upon this, two or three more hurry out, and the intelligence spreading, the vicinity is soon filled with warriors in a state of great fury. These, in their haste, being only capable of directing their movements by feeling, frequently lose their footing, and tumble down hill. The soldiers, says Smeathman, fight to the very last, disputing every inch of ground. Neither can a building stand so as to get a view of the interior parts without interruption; for the labourers keep barricading all the way, stopping up the different galleries and passages which lead to the apartments, particularly the royal chamber, all the entrances to which they fill so artfully as not to let it be distinguishable while the work remains moist, and externally it appears like a shapeless lump of clay. It is large enough to hold many hundreds of the attendants, besides the royal pair. These faithful subjects never abandon their charge, even in the last distress.

"If," says Huber, "we are desirous of beholding regular armies wage war in all its forms, we must visit the forests in which the wood-ant (*Formica rufa*) establishes its dominion over every insect in its vicinity. We shall there see populous and rival cities, and regular military roads diverging from the ant-hill like so many rays from a centre, frequented by an immense number of combatants of the same species, for they are naturally enemies, and jealous of encroachment. I have witnessed in these forests the inhabitants of two large ant-hills engaged in spirited combat; two empires could not have brought into the field a more determined body of combatants. The rival cities were a few paces from each other, and alike in population."

The author describes the ground covered with the ants, when both armies met. Thousands took their stations on the highest ground, and fought in pairs. Many were engaged in leading away prisoners, who endeavoured violently to escape. The scene of warfare was almost three feet square, and a penetrating odour exhaled from all sides. Numbers of dead ants were seen covered with venom. The little creatures laid hold of each other's legs and pincers, and dragged their antagonists on the ground. They were often so closely wedged together that they fell on their sides, and fought a long time in that situation in the dust, till a third came to decide the contest. Sometimes both received succour at the same moment, when the whole four, keeping firm hold of a foot or antennæ, made ineffectual attempts to win the battle. On the approach of night, each party retired gradually to their own city, and next morning returned to the conflict with increased fury. The event remained for a long time doubtful, but by mid-day the contending armies had removed to the distance of a dozen feet from one of the cities, whence it was concluded some ground had been gained. The ants fought so desperately that they did not perceive they were watched, seeming to be wholly absorbed in the object of finding an enemy to wrestle with. This battle terminated without any disastrous results to the two republics; and in fact its duration appeared to be shortened by long-continued rain, which compelled each of the belligerents to keep within their walls, and the warriors ceased to frequent the road which led to the camp of the enemy.

PLATE XXX.—VERMEOLOGY.

The animals figured on this plate belong to the Linnæan genus Asterias, and to the class Echinodermata, in the more modern system of Cuvier.

Fig. 1. *Asterias caput medusæ*, Linn. *Euriale caput-medusæ*, Cuv.

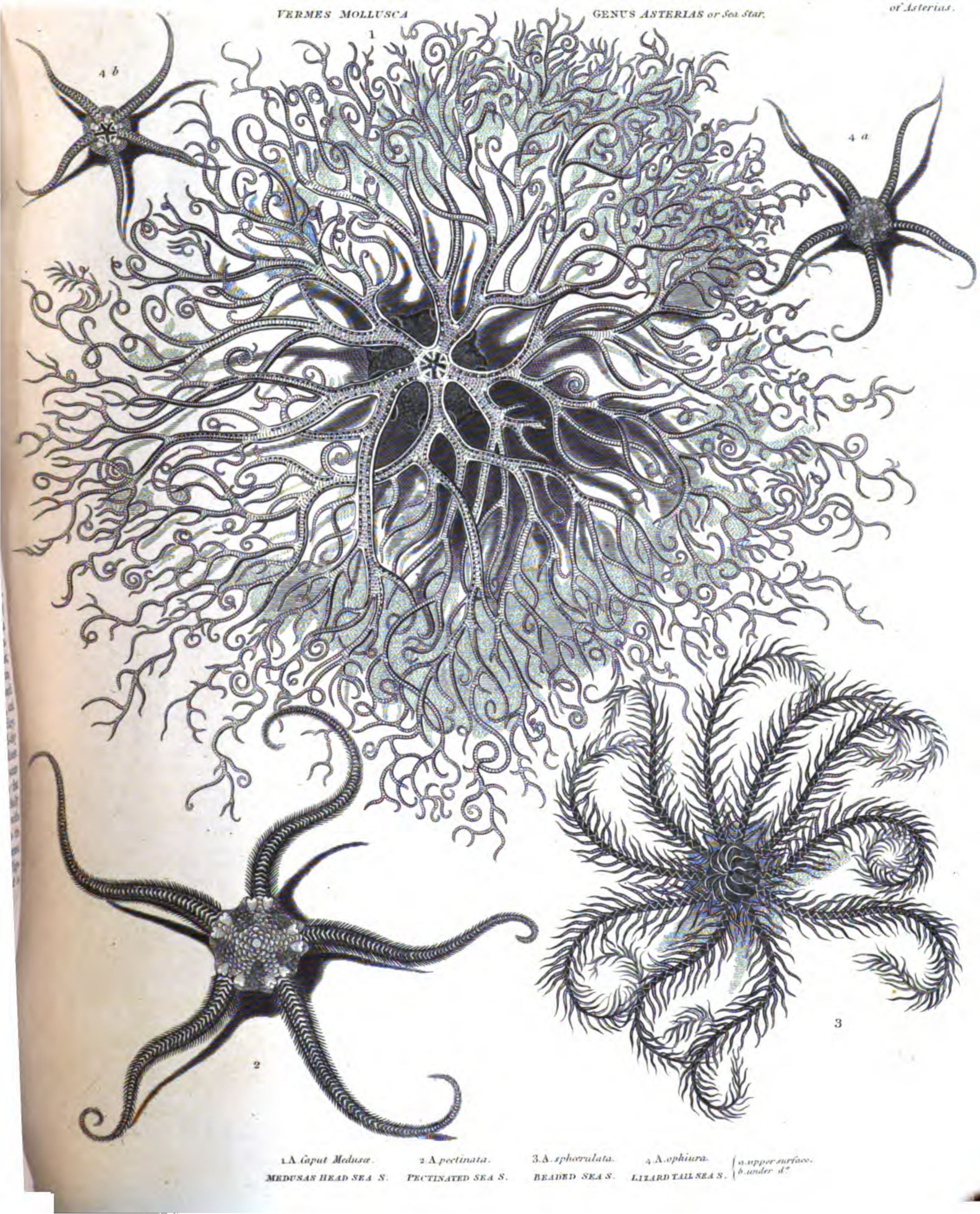
Fig. 2. *Asterias pectinata*, Linn. *Ophiura pectinata*, Cuv.

Fig. 3. *Asterias opherulata*, Linn. *Comatula pectinata*, Cuv.

Fig. 4, 5, 6. *Asterias ophiura*, Linn. *Ophiura texturata*, Cuv.

Linn. Syſt. **VERMEOLOGY.** PLATE 30.
of Asterias.

VERMES MOLLUSCA GENUS ASTERIAS or Sea Star.

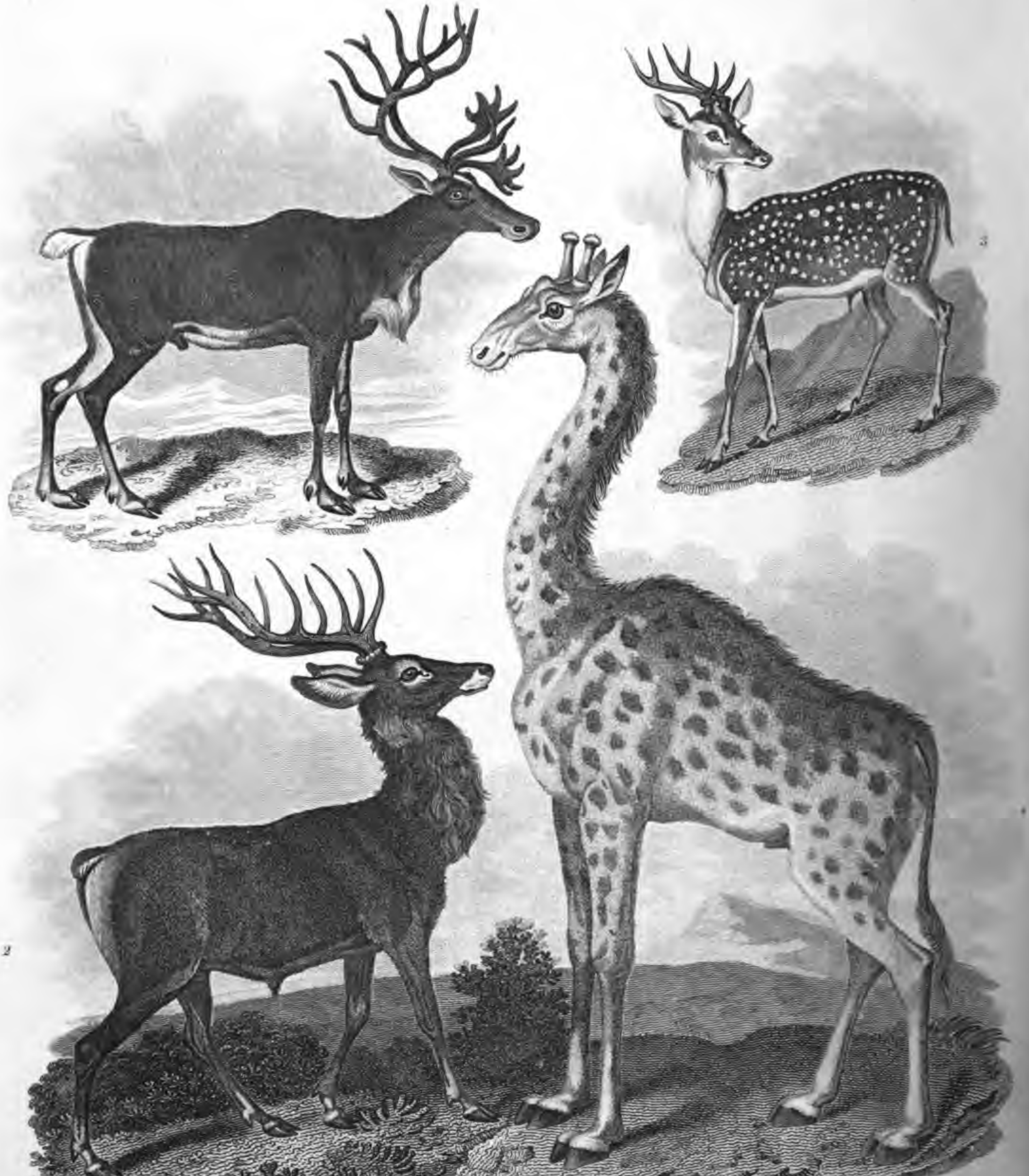


1. A. *Caput Medusæ.* MEDUSAS HEAD SEA S.
2. A. *pectinata.* PECTINATED SEA S.
3. A. *sphærulata.* BEADED SEA S.
4. A. *ophiura.* LIZARD TAIL SEA S. { a. upper surface. b. under d°

Linn. Syſt. *PLATE 31*

QUADRUPEDS.

MAMMALIA GENUS CERVUS GENUS CAMELOPARDALIS.



1. C. Tarandus Rein Deer.—2. C. Elaphus Stag Hart or Red Deer —3. C. Axis Spotted Axis —4 Camelopardalis Giraffa Camelopard.

PLATE XXXI.—QUADRUPEDS.

MAMMALIA. Genus CERVUS. Genus CAMELOPARDALIS.

FIG. 1. *The Rein-Deer.* *Cervus tarandus*, LINN.

The adult male of this species, in a wild state, is the size of a stag, or about four and a half or five feet high; but the female is much smaller. It is the only species of the genus that has been completely domesticated, and that is steadily employed in the service of man. It is found in most of the northern countries of Europe, Asia, and America. The colour is of a dusky brown above, and white beneath. The hair on the lower part of the neck is much longer than on any other place. The hoofs are large, long, and black. The female has horns as well as the male, but those of the latter are much the largest, and are long, slender, branched, and upright, furnished with brown antlers, with widely expanded and palmated tips, directed forward.

The figure of the rein-deer is rather heavy, when compared with other species. The neck is short, and the head carried straight forward, giving the animal a dull appearance. The females produce, in May, two fawns at a birth. The rein-deers swim with great facility, and are so buoyant as to keep half the back above water; and the great size of their feet enables them to make rapid way across even the strongest currents. They defend themselves with great courage, and kick furiously with their hind feet, when attacked by the wolf, seldom failing to repel a single one.

To the poor Laplanders, the rein-deer is a substitute for the horse and cow, goat and sheep. They make cheese of its milk, feed on its flesh, and clothe themselves in its skin. They make its tendons into bowstrings; and when split, use them as a coarse kind of thread. They boil their horns into glue, and make their bones into spoons; and in winter the rein-deer supplies the place of a horse, by drawing their sledges, and that even across the snows, in which the breadth of their hoofs prevents their sinking. They run at great speed, performing immense journeys. With two of them yoked to a sledge, it is said the Laplander will travel upwards of a hundred English miles in a day. The traveller lightens the tedium of his journey by chanting some wild love song. These often possess much beauty, and breathe the native wildness of that rude and uncivilized people. Several have been translated into English, and have attracted universal attention for their simplicity. The following is a specimen of one of these, from Consett's Tour in Lapland. It affords a happy illustration of that consolation which contentment brings in any condition of life.

> The snows are dissolving on Tornao's rude side,
> And the ice of Lulhea flows down the dark tide:
> Thy dark stream, oh Lulhea, flows freely away!
> And the snow-drop unfolds her pale beauties to-day.
> Far off the keen terrors of winter retire,
> And the North's dancing steamers relinquish their fire;
> The sun's genial beams swell the bud on the tree,
> And Enna chants forth her wild warblings with glee.
> The rein-deer, unharness'd, in freedom shall play,
> And safely o'er Odon's steep precipice stray;
> The wolf to the forest's recesses shall fly,
> And howl to the moon as she glides through the sky.
> Then haste, my fair Luah, oh! haste to the grove,
> And pass the sweet season in rapture and love;
> In youth let our bosoms in ecstacy glow,
> For the winter of life ne'er a transport can know.

It may seem difficult to account for the mode by which these people direct their course to their destination, over a country which presents a uniform surface of snow and ice,—and this, even during the night. It is to the rein-deer they trust their lives; and accidents are said to be of rare occurrence.

The rein-deer feeds on the *Lichen rangiferinus*, and the *Lichen Islandicus*, the buds of coniferous evergreens, and other arctic plants. During the summer, this animal migrates to the woods and mountains, to avoid the persecutions of various insects, which are a pest to them, especially the Œstrus tarandi, the very hum of one of which will put a whole herd to flight. This insect penetrates the skin of the deer, and deposits its egg under it, producing a painful inflammation, the larvæ feeding on the juices, until they assume the winged state.

It is singular, that this animal inhabits a very limited physical range, and cannot exist beyond these precincts. Cuvier, after a laborious investigation of these limits, has proved, that it never extended farther north than the northern boundary of Poland, nor farther south than the Baltic. An attempt to naturalize this species in Great Britain has been made, but failed. In the fall of 1823, a Norwegian, with five rein-deer, arrived in England, where they remained during the winter, and were fed with the *Lichen rangiferinus.* They continued healthy until the following April, soon after which they all died. The same attempt was made in Ireland, but with no better success. The rein-deer is found wild in the Uralian mountains, and in Siberia. It should be remarked, that few American quadrupeds have been found precisely similar to their European representatives, and that recent writers have doubted whether the moose and rein-deer of this country are identical with those of Scandinavia. The American Indians have never availed themselves of the docility of this animal.

It is a well established fact, that the rein-deer will eat, with avidity, the lemming, or mountain rat, presenting one of the few instances of a ruminating animal being in any degree carnivorous.

FIG. 2. *Stag—Hart*, or *Red Deer.* *Cervus elaphus*, LINN.

The stag is the most beautiful of the deer kind, if we take into consideration the elegance of his form, the lightness of his motions, the flexibility of his limbs, and his bold branching horns, which have three antlers, all curving upwards, the summit forming a crown of snags, from a common centre. His eyes are large, bold, and expressive, and are furnished with lachrymal sinuses; the fur is reddish-brown in summer, and brownish-gray in winter; the hind quarters are of a pale buff.

It is said that formerly the horns of stags grew into a much greater number of ramifications than at the present day; this is attributed by some to the greater profusion of food, and from the animal having more repose, before population became so dense. In some individuals, these multiplied to an extraordinary extent. There is one in the Museum of Hesse Cassel, with twenty-eight antlers. Cuvier mentions one of sixty-six, or thirty-three on each horn. This stag was killed by the first king of Prussia. The stag begins to shed his horns in the latter part of February, or beginning of March, when he retires to thickets, and remains till the horns are completely restored. Soon after the old horns have fallen off, a soft tumour begins to appear, which is quickly covered with a velvet-like substance. From this, every day little buds shoot forth, like the grafts of a tree, and, rising by degrees, spring out the antlers on each side; the skin continues to cover it for some time, and is furnished with blood-vessels, which supply the growing horn with nourishment, and occasion the furrows observable in them when the covering is stripped off. When the horns are full grown, they acquire strength and solidity, and the velvet covering, or skin, with its blood-vessels, dries up, and begins to fall off; which is facilitated by the animal rubbing them against trees. The hind is gravid eight months and some days, and produces a single fawn, in May or June.

The full-grown stag is from three feet six inches to four feet high at the shoulders, and the horns rise nearly three feet above the head. He is said to be very long-lived; but late observation limits the period of his existence to twenty years.

The stag inhabits every part of Europe except Lapland; he is not rare in several parts of England and Scotland, and is met with in a wild state in Ireland. Stag hunting has been a favourite pastime from remote antiquity. He is a strong animal, capable of running a long time, and of making stout defence when overtaken. In Britain, large tracts of land were anciently set apart for making forests to shelter stags, and even villages and sacred edifices were destroyed, and converted into a wide waste. In the reigns of William Rufus and Henry I. it was considered more criminal to kill a beast of chase than a human being.

Anecdotes. Among the varied, novel, and diversified experiments of a sporting nature, performed by the late Lord Oxford, perhaps none was more eccentric than his determination to drive four red-deer stags in a phaeton, instead of horses; and these he had reduced to perfect discipline for his excursions and short journeys on the road; but, unfortunately, as he was one day driving to New-Market, their ears were saluted with the cry of a pack of hounds, which, soon after crossing the road in the rear, caught scent of the "four in hand," and commenced a new kind of chase with "breast-high" alacrity. The novelty of this scene was rich beyond description. In vain did his lordship exert all his charioteering skill; in vain did his well-trained grooms energetically endeavour to ride before him; reins, trammels, and the weight of the carriage, were of no effect, for they went with the celerity of a whirlwind. Luckily, his lordship had been accustomed to drive this set of "fiery-eyed steeds" to the Ram Inn, at New-Market, which was most happily at hand, and to this his most fervent prayers had been ardently directed. Into the yard they suddenly bounded, to the consternation of hostlers and stable boys, who seemed to have lost every faculty but that of amazement. Here they were luckily overpowered, and the stags, the phaeton, and the driver, were all instantaneously huddled together in a barn, just as the hounds appeared in full cry at the gate.

Some years since, a stag, which had afforded Lord Derby's hounds a fine run, leaped a boarded gate into a gentleman's grounds with a spiked roller on the top of it, the height of the gate and roller being eight feet four inches. What made this great feat of animal power more remarkable, the deer was apparently run down at the time, with hounds snatching at his haunches as he came down the road from whence he took the leap.

FIG. 3. *Spotted Axis. Cervus Axis*, LINN.

This beautiful animal inhabits those vast and wooded plains which bound the river Ganges, in India. Its horns are rounded, elongated, and rather smooth. The anterior antler near the burr; the summits are converging. The second antler is on the internal side of the main branch. The lachrymal sinuses are small. The fur of the upper part of the body is of a bright fulvous; the under part, inside of the legs and thighs, are white. The whole body is studded with elegantly disposed white spots. Along the back there are two rows of spots, parallel to each other. Those on the other parts of the body are irregular. The head and neck are of a grayish tinge. The tail is rather long, reddish above, and white beneath.

FIG. 4. *Cameleopard. Camelopardis giraffa*, LINN.

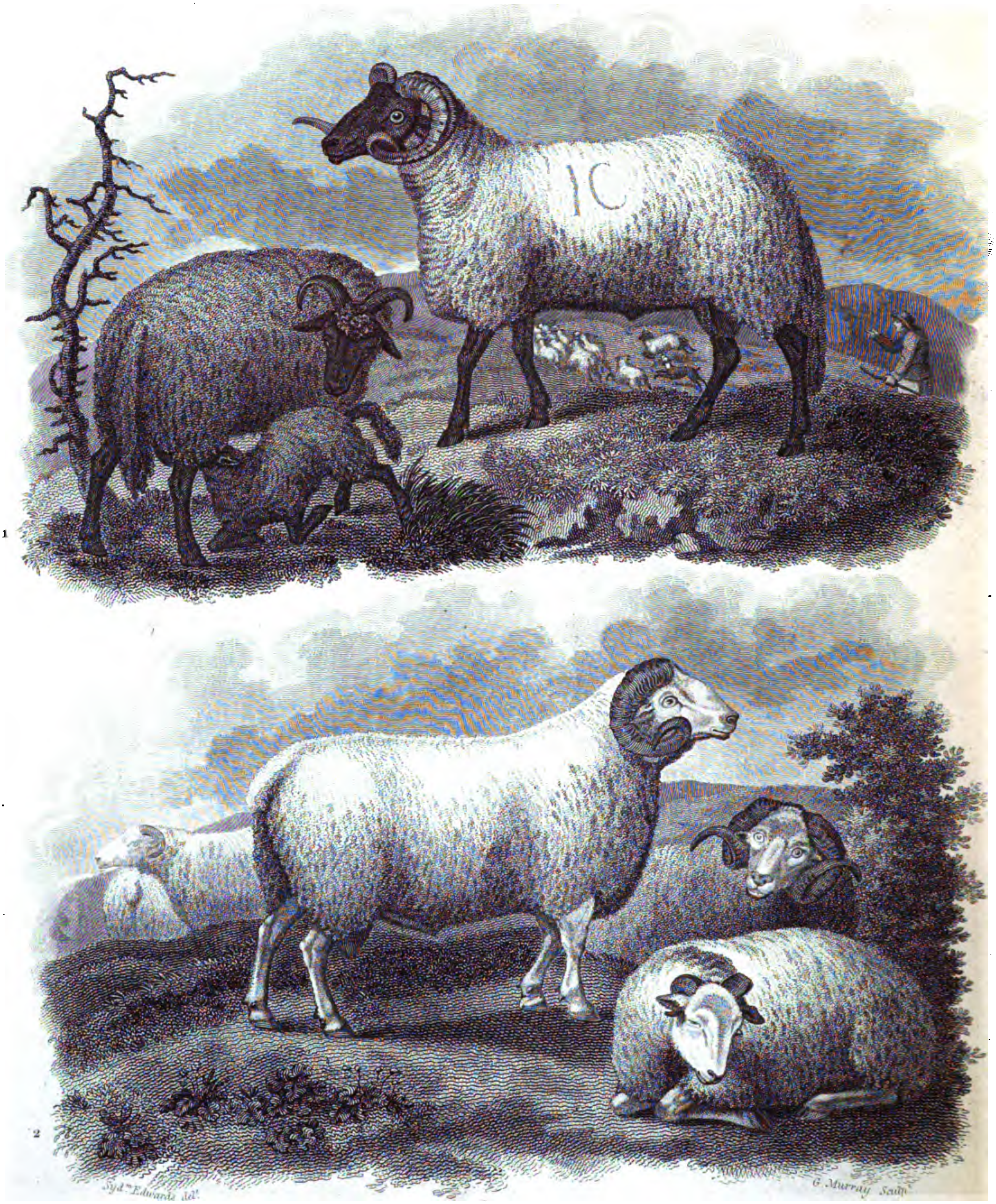
The existence of this wonderful animal was long doubted by modern naturalists; and the descriptions which we had of it were far from being satisfactory. Even in the time of Buffon the accounts of it were clothed in fable. It fell to the lot of Le Vaillant to give the first authentic notice of this, the tallest of all known quadrupeds.

The height of the giraffe is about eighteen feet from the crown of the head to the ground, and it measures only nine feet at the rump; from the extremity of the tail to the tip of the nose, when the head is stretched forward, it is twenty-two feet; the fore and hind legs are of an equal height, but the shoulders rise at an angle of about forty-five degrees; the neck is slender and elegant, and about seven feet in length, adorned on the upper side with a short mane, which may be said to extend the whole length of the back; on the crown of the head it is furnished with two perpendicular horns, of about six inches in length, covered with hair, and round at their tips, where they are encompassed with a circle of short black hairs, which Le Vaillant says the male loses at the age of three years, while on the female it remains much longer. On the middle of the forehead there is a protuberance of about two inches high; this is not a fleshy excrescence, but an enlargement of the bony substance. The eyes are large, brilliant, and full, and are so placed in the head that the animal can see on every side. The tongue is extensile, smooth, and slightly adhesive, covered with spotted papillæ, which can be raised or depressed at pleasure, as at times the tongue is perfectly smooth and soft, and at others exceedingly rough. The application of this organ to the leaves of plants before they are carried into the mouth, enables the animal to reject those which are noxious. As the tongue is much exposed to the sun's rays when feeding, it is furnished with a black *rete mucosum*, to prevent its being blistered. The tongue can be so tapered as to enter the ring of a very small key; its taste is exceedingly acute. Sir Everard Home, in his interesting memoir on the tongue of the giraffe, says, "The tongue is to be considered as a congeries of muscles acting upon one another, and, in this respect, differing from muscles applied to bones and other solid substances; but that of the giraffe has so many peculiarities, as, in my opinion, give it a claim to be considered separately from the tongues of other animals, and viewed as a construction in which a greater variety of actions are displayed, than are to be met with in others. It not only performs the office of the organ of taste, but has, besides, nearly all the powers of the proboscis of the elephant, although not possessed of the same strength. They differ, indeed, in one being an elongation of the organ of smell, the other of the organ of taste. The proboscis is restrained from elongation in extent beyond an inch, by means of the cartilaginous tubes it contains; but the giraffe's tongue, which, when extended after death, is seventeen inches long, can, in the living body, be so diminished in size as to be inclosed in the animal's mouth." Its ears are long, they are constantly bent forward, and well formed to receive sounds. The hide, which is, at first, of a light red, becomes of a deeper colour as the animal advances in age, and is, at length, of a yellow brown in the female, and approaching to black in the male. The whole body, neck, and fore arms, are covered with large spots of a deep chocolate brown; those on the female are somewhat lighter. The female goes with young twelve months, and produces but one at a birth.

The giraffe feeds principally in its native wilds on a tree called the *Acacia xariffiana*. Of its habits and manner of feeding, there is still great diversity of opinion. In respect to the difficulty stated by some, which the giraffe has of reaching the ground with its head, M. Acerbi, who saw the one which arrived in England in 1827, as also the one which was sent to the king of France, as well as two others, says, "There are few naturalists who have not contributed to perpetuate the vulgar error, that in eating and drinking from the ground, the giraffe is compelled to stretch his fore legs 'amazingly' forwards. Some even assert that he is obliged to kneel down. Of the few which fell under my observation, three took their food from the ground with comparative facility; and one of them was scarcely under the necessity of moving its fore legs at all. I should infer, that every giraffe, in a natural state, is enabled to eat or drink from the ground without inconveni-

QUADRUPEDS.

GENUS OVIS. SHEEP VAR. HORNED SHEEP.


1
2
Sydⁿ Edwards del.
G Murray Sculp.

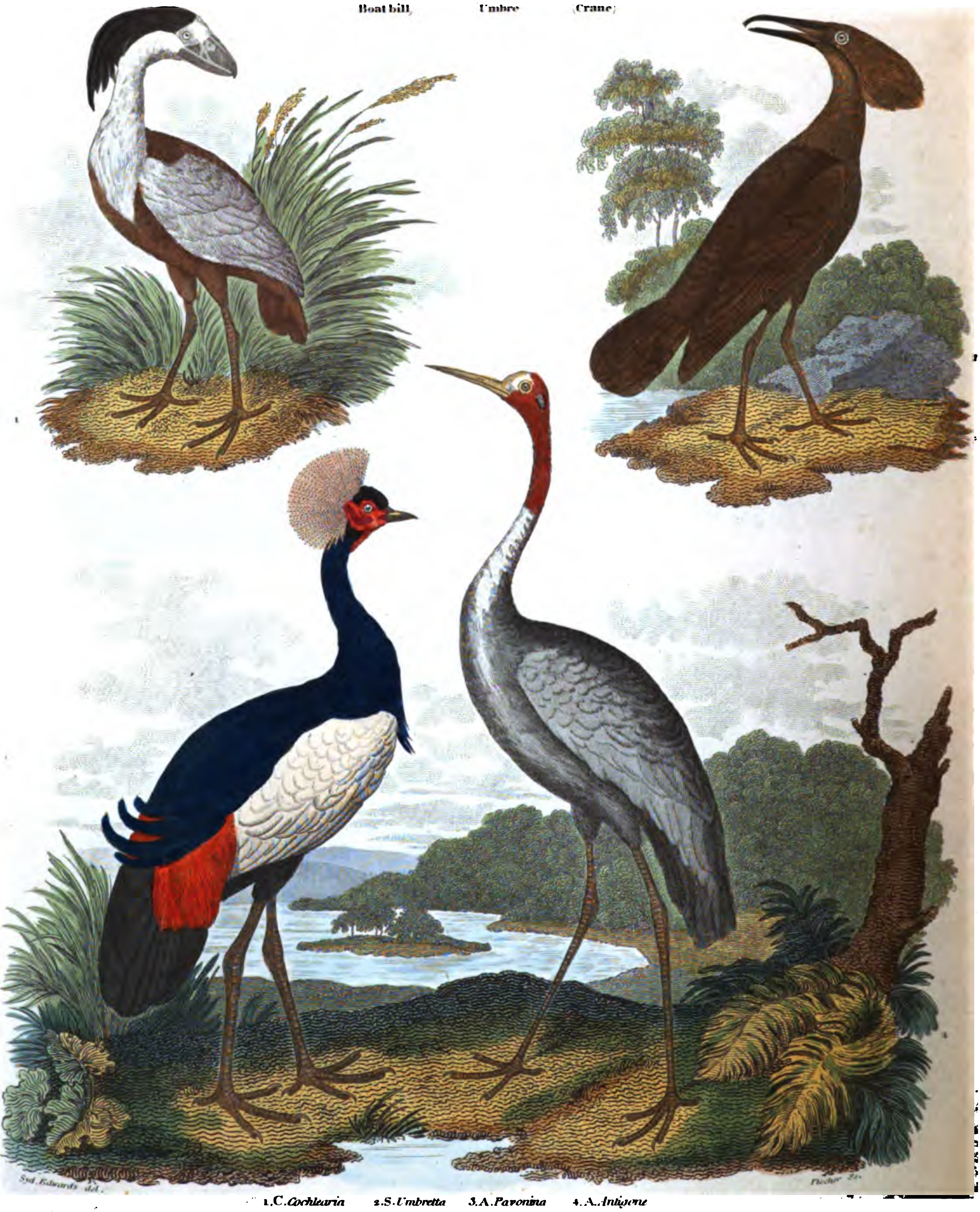
1.Norfolk Breed. 2.Hertfordshire Breed.

in. Syst. PLATE

ORNITHOLOGY.

Order GRALLÆ.

GENUS *CANCROMA* — G. *SCOPUS* — G. *ARDEA*
Boat bill, Umbre (Crane)


1
3
Syd. Edwards del.
Fischer sc.

1. C. *Cochlearia* CRESTED B. 2. S. *Umbretta* TUFTED U. 3. A. *Pavonina* CROWNED C. 4. A. *Antigone* INDIAN C.

ence; and that, where any difficulty exists in this respect, it is the effect of habit, acquired in the progress of domestication."

Le Vaillant's enthusiastic description of his first seeing the skin of a giraffe in Africa, and the strong excitement it produced upon him, with the feelings which he experienced at the capture of one, beautifully illustrates the ardour of a keen naturalist. *See his Second Voyage to Africa.*

The female giraffe, sent to England in 1827, a present from the pacha of Egypt to the king, was the first which ever reached that country. It was a young one, and measured only ten feet when it arrived; it grew upwards of three feet afterwards, before it died. Indeed, no other but this and the one in Paris, had reached Europe since the end of the fifteenth century. At that period, the soldan of Egypt sent one to Lorenzo di Medici. It was kept at Florence, and allowed to range at liberty. It became very familiar with the inhabitants. We have no other accounts of any being seen in Europe since the time of the Roman empire, at which period they were exhibited at the games of the circus, and at principal processions. Gordian III. had ten alive at one time in Rome. The long period which had elapsed since they had been seen by Europeans, induced a belief that their history was in a great measure fabulous, but the facts of the case are now clearly proved.

PLATE XXXII.—QUADRUPEDS.

Genus Ovis. Sheep. Variety, Horned Sheep.

Fig. 1. *Norfolk breed, or variety.*

In this sort of sheep, the face is black; the horns large and spiral; the carcase long, weak, and thin; narrow chine; large bones; very long black or gray legs; mutton fine grained and high flavoured, but does not keep well in hot seasons. The weight per quarter from 16 to 20 pounds. The wool in the best part short and fine, but part coarse.

Fig. 2. *Hertfordshire variety.*

The above are varieties of the sheep, which by care have been brought to assume combinations of valuable properties almost without end. The sheep (Ovis) differs so slightly from the goat, that both genera are by some naturalists united. The principal distinctive characters consist in the absence of a beard, and the form and spiral direction of the horns. The wild sheep (Ovis ammon) is by no means the helpless animal we are accustomed to see in a domestic state; the latter is probably the only one of all our domestic quadrupeds incapable of returning to a state of nature, even if placed in favourable circumstances. It requires the care of man to lead it to pasture, as well as to protect it from the changes of the atmosphere. Its products are the flesh, milk, skin, and especially the wool, which is becoming of vast importance in America, and employs a large capital in its manufacture.

The time allowed for fattening sheep is about three months before they are sent to market, when they have attained about three years; but where the fleece is the object, it may be delayed to the sixth, seventh, or even the tenth year, in a district where they are healthy. Their ordinary life does not exceed twelve or fifteen years. The fleece is shorn annually, about the month of May, sometimes being washed on the back of the animal, but if cut without washing, the oil it contains preserves it from insects. The sheep require particular attention afterwards, being then exceedingly sensitive to the changes of temperature. At all times they are subject to various maladies.

Among the numerous varieties, the most celebrated for the fineness of the wool is the Spanish merino, as improved in Germany, from which all the other approved European varieties are crosses. The English sheep is the most celebrated for the quantity of its wool.

An animal more nearly resembling the goat has been found wild in numerous flocks inhabiting the Rocky Mountains, frequenting the summits in summer and the valleys in winter. It is little known to naturalists, but in some parts forms the principal food of the natives. Its flesh is represented to be inferior, and its fleece of little value. In size it approaches the domestic sheep, and has long hair extending beyond the wool; the horns are five inches in length and one in diameter. An interest has recently been excited in England respecting this animal, from a supposition that the fleece resembles somewhat that of the goat of Cachmere.

From the length of time the sheep has been domesticated, and the numerous variety of forms it has assumed, it is now impossible to point out its origin. Climate, food, and the unwearied exertions of cultivators to improve the breed of an animal so valuable to man, have all tended to produce these varieties. In the selection of its food, few animals display greater sagacity than the sheep; nor does any quadruped manifest greater dexterity and cunning in its attempts to elude the vigilance of the shepherd, in order to steal such delicacies as are agreeable to its palate.

Protected by a thick and warm fleece, sheep have been known to endure great severities of climate. They are possessed of instinct, by which they can foresee an approaching storm, and seek refuge under some hill, or projecting cliff. Whole flocks have frequently been buried for days under a covering of snow, in which situation they keep huddled together as compactly as possible, and have been taken from these situations without having suffered the slightest injury. The poet of nature, Thomson, thus beautifully alludes to the sheep under such circumstances.

> Oft the whirlwind's wing
> Sweeps up the burden of whole wintry plains
> At one wide waft; and o'er the helpless flocks,
> Hid in the hollow of two neighbouring hills,
> The billowy tempest whelms.

The ewe produces one or more lambs at a birth, and sometimes, though rarely, three or four. She is gravid five months.

For articles on wool, sheep raising, history, &c. &c. see Rees's Encyclopedia, Encyclopedia Americana, and Loudon's Encyclopedia of Agriculture.

PLATE XXXIII.—ORNITHOLOGY.

Fig. 1. *Crested Boatbill. Cancroma cochlearia*, Linn. and Cuv.

Size of a fowl: length twenty-two inches: the beak is four inches long, and mostly dusky, though in some individuals it is dark brown: the skin between the under jaw capable of being distended: from the occiput arises a long black crest, the feathers of which it is composed being narrow, and ending in a point; the middle ones are six inches in length; the others lessen by degrees to one inch, which is the length of the outer ones: between the beak and eye, the skin is naked and dusky: the forehead is white: across the lower part of the neck, behind, is a transverse band of dusky black, passing forwards on each side towards the breast, and ending in a point a little above the bend of the wings: the rest of the neck, with the breast, and upper part of the abdomen, are bluish white: the rest of the abdomen and the thighs are rufous; the feathers at the base of the neck are loose, as in the herons: the thighs are four inches in length, and the leg three and a half; the latter, and the naked space on the lower part of the former, are yellowish brown: the claws are black. This species varies in having the body spotted with brown, and also in having the upper parts pale rufous instead of cinerous; the tail reddish ash, and the under parts entirely of a cream colour; with the beak and legs yellow-brown. This bird inhabits various parts of South America, frequenting the borders of rivers. It perches on the trees overhanging the streams, pouncing upon the fish which swim beneath; it is likewise said to feed on crabs.

FIG. 2. *Tufted Umbre. Scopus umbretta*, LINN. and CUV.

The tufted umbre is the size of a crow: in length twenty inches: the beak is three inches and a half long, and brown: from the hind head arises a dense crest of loose feathers, four inches in length; this, as well as the whole body, is of an uniform umbre-colour, the under parts being palest, and the shafts of the neck-feathers rather lighter in shade: the wings and tail are even; the latter is banded with bars of deeper brown, and tipped with the same: the legs are long, and the thighs naked for two-thirds of their length; both are dusky: the claws are small, and bent. The female has no crest. Native of Southern Africa.

FIG. 3. *Crowned Crane. Ardea Pavonia*, LINN. *Grus Pavonia*, CUV.

This most beautiful bird is as large as the common heron: the length two feet nine inches: the beak is two inches and a half long, straight, and of a brownish colour: irides gray: the crown of the head covered with soft black feathers, like velvet; on the hind part is a tuft composed of hair, or rather bristles, arising near each other at the base, and spreading out on all sides in a globular form; this is four inches in length, and of a reddish-brown colour: the sides of the head are bare of feathers, being covered only by a fleshy membrane, of a reddish colour at the lower part, and in shape not unlike a kidney: on each side of the throat hangs a kind of wattle: the general colour of the bird bluish ash: the feathers on the fore part of the neck are very long, and hang over the breast: wing-coverts white: the greater quills and tail are black, and the secondaries chesnut: the legs and bare part above the knee are dusky. The female is black where the male is blue-ash, and the wattles on the throat are wanting.

This bird inhabits several parts of Africa, particularly the coast of Guinea, as far as Cape Verd. It is a tame species, and is often kept in aviaries; it feeds upon worms and vegetables; it often sleeps upon one leg; runs very fast, and flies strong, and for a long time together.

FIG. 4. *Indian Crane. Ardea Antigone*, LINN. *Grus Antigone*, CUV.

Length five feet: beak greenish yellow, with the tip dusky: irides bright reddish hazel: the crown of the head naked, and white, with a small spot on each side: the rest of the head and part of the neck covered with a naked red skin: the general colour of the plumage is of a fine cinerous, the neck lightest: the quills are black, the secondaries cinerous; those nearest the body are pointed at the ends, and longer than the quills, over which they hang: the tail is ash coloured: the legs and naked space above the knee are red: the claws white.

This species is found in flocks near Calcutta, and other parts of the East Indies. It is very numerous, migrating into that part of the Russian territory situated beyond Lake Baïkal, frequenting the plains and marshy places on the borders of the rivers Onan and Argun.

PLATE XXXIV.—ORNITHOLOGY.

FIG. 1. *Guinea Hen*, or *Pintado. Numida meleagris*, LINN. and CUV.

The Guinea pintado is larger than the tame cock: length twenty-two inches: beak of a reddish horn colour: its head is bare of feathers, and covered with a naked skin of a bluish colour: on the crown is a callous conical protuberance of a bluish red colour, and compressed at the sides: on each side of the upper mandible, at the base, hangs a loose wattle, which in the female is red, and in the male of a bluish colour: the upper part of the neck is nearly naked, being furnished with a few straggling hairy feathers: the skin is of a bluish ash: the lower part of the neck is covered with feathers of a purple hue: the rest of the plumage is blue-black, marked with white spots of different sizes on the whole of the feathers, the breast only excepted, which is of a uniform gray-blue: the greater quills are white, and the rest are similar to the upper parts of the plumage, spotted, and longitudinally marked with white: tail the same. A hybrid has been produced between a male pintado and a common domestic hen.

Africa is the native place of this bird, from whence it has been diffused over every part of Europe, the West Indies, and America. It is now sufficiently common in our poultry-yards, but from the circumstance of the young ones being difficult to rear, they are not bred in numbers at all equal to those of the domestic poultry. The female lays many eggs in a season, which she frequently secretes till she has produced her young brood. The egg is smaller than that of a hen, and of a rounder shape; in colour reddish white, obscurely freckled with a darker colour: it is very delicious eating.

The pintado is a restless and clamorous bird: its voice is harsh and unpleasant: it consists chiefly of two notes, *ca-mac, ca-mac*, frequently repeated; it is compared by Latham to a door turning on its rusty hinges, or to an ungreased axletree. During the night it perches on high places, and is often so easily disturbed as to hinder the rest of a family by its unceasing cry. It delights in rolling in the dust, to free itself from insects.

In a wild state, these birds associate in numerous flocks of two or three hundred each. They delight chiefly in marshy and damp morassy places, where they subsist almost wholly on insects, worms, and seeds. Amongst the Romans they were in great request for their banquets; they are greatly prized in this country by some persons, their flavour being considered to resemble that of the pheasant.

FIG. 2. *Crested Pintado. Numidia cristata*, LINN. and CUV.

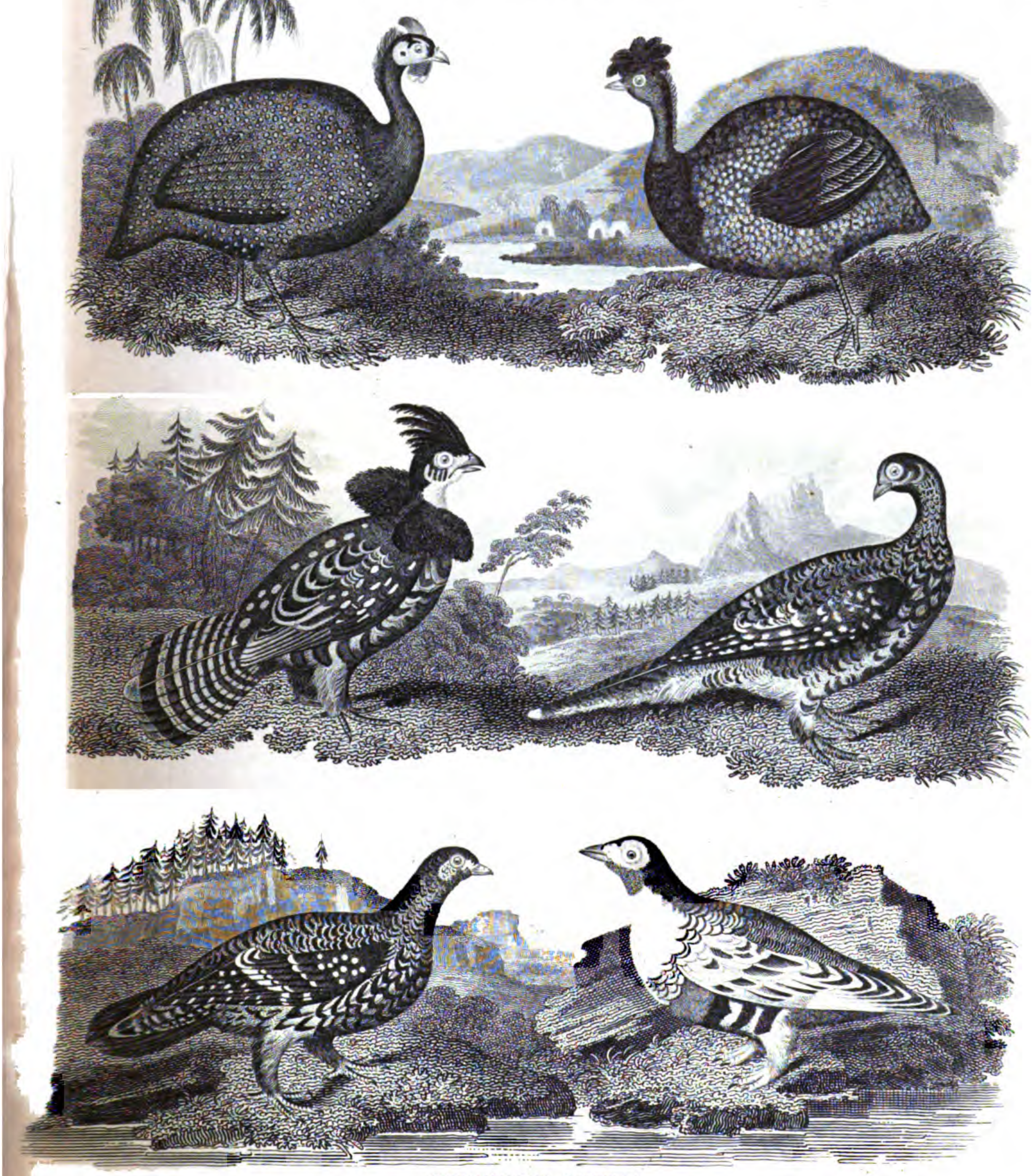
This species is smaller than the Guinea pintado: its beak is of a horn colour, surmounted by a bluish cere near the nostrils: on each side the lower mandible of the beak is a skin with a longitudinal fold, instead of a wattle: the throat, and some other parts, are nearly destitute of feathers. The head is surmounted by a fine crest of black feathers, with delicate webs: plumage black, spotted whitish blue encircled with a brilliant blue. Inhabits the hottest part of Africa, and the interior of Guinea. They live in herds of many hundreds, composed of several united coveys; their cry is discordant; their manners like the rest of the genus, and are easily domesticated.

FIG. 3. *Ruffled Grouse. Tetrao umbrellus*, LINN. and CUV.

This is the partridge of the eastern States, says Wilson, and the pheasant of Pennsylvania and the southern districts, and is well known in every quarter of the Union, inhabiting a very extensive range of country. It was found by Captains Lewis and Clarke in crossing the great range of mountains that divide the waters of the Columbia and Missouri, 3000 miles from the latter. Its favourite places of resort are high mountains, covered with the balsam-pine, hemlock, &c. Unlike the pinnated grouse, it always prefers the woods; is seldom found in open plains; but loves the pine-sheltered declivities of mountains near streams of water. The habits of the pheasant are solitary, seldom being found in coveys of more than four or five together, and more usually in pairs, or singly. They leave their sequestered haunts early in the morning, and seek the

Linn. Syſt. **ORNITHOLOGY.** PLATE 34.

Div. 1st Land Birds. — Order GALLINÆ.



GENUS *NUMIDIA* — G *TETRAO.*

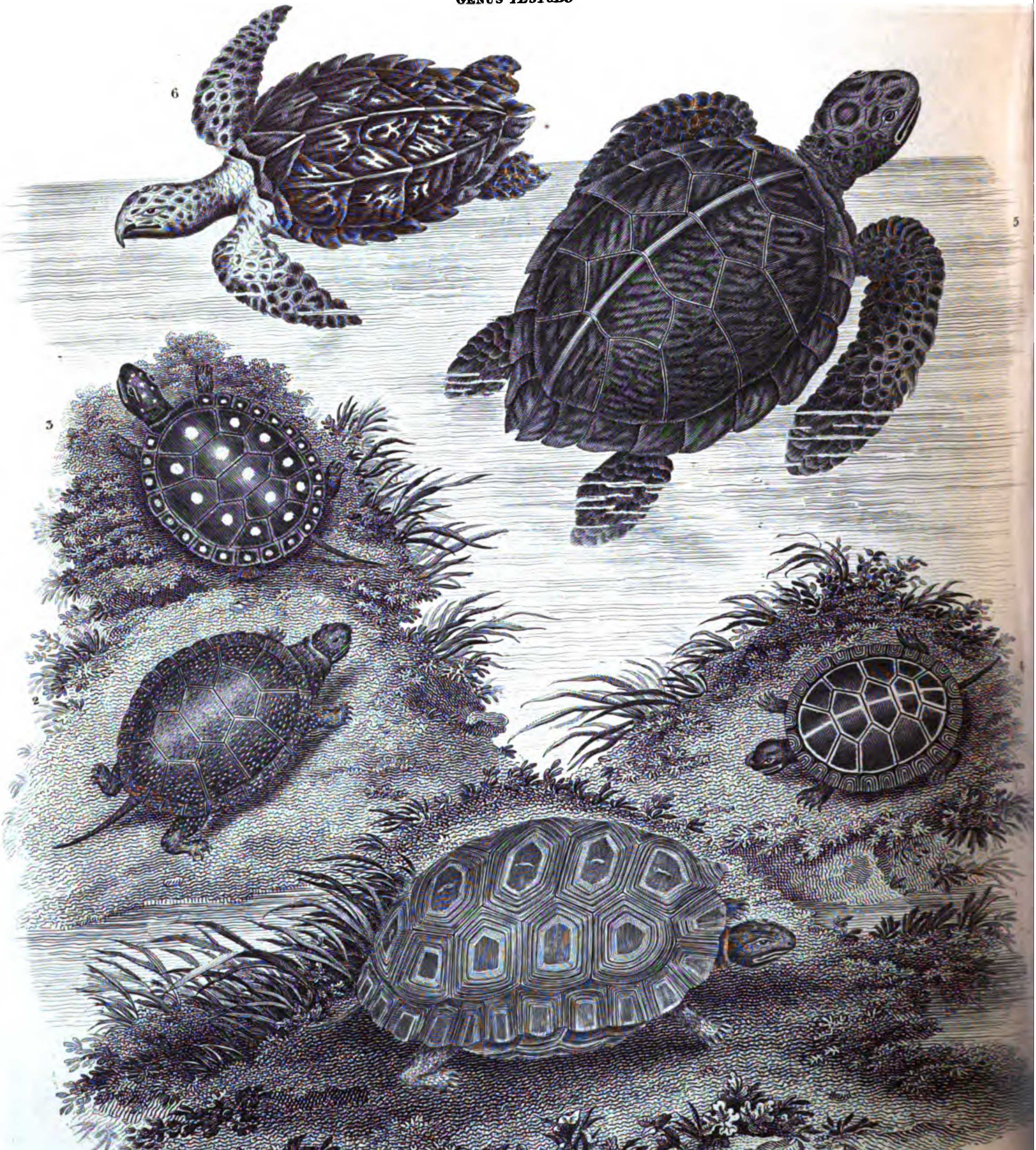
(Pintado) (Grouse)

1. N. *Meleagris.* GUINEA HEN or PINTADO.
2. N. *cristata.* CRESTED P.
3. T. *umbellus.* RUFFED or RUFF NECKED GROUSE.
4. T. *Alchata.* PIN TAILED G.
5. T. *Canadensis.* SPOTTED G.
6. T. *paradoxus.* HETEROCLITOUS G.

AMPHIBIA

PLATE 35

GENUS *TESTUDO*



1. T. *denticulata* 2. T. *Europæa* 3. T. *guttata* 4. T. *Picta* 5. T. *Mydas* 6. T. *imbricata*

DENTICULATED TORTOISE GREEN SPECKLED T. SPOTTED T. PAINTED T. ESCULENT GREEN TURTLE HAWKSBILL TU.

path, or road, to pick up gravel, and glean among the droppings of the horses. They generally move along with great stateliness, with their broad fan-like tail spread out. The drumming, as it is called, of the pheasant, is a singularity of this species. This is performed by the male alone. In walking through solitary woods, says the same inimitable author, a stranger is surprised by suddenly hearing a kind of thumping very similar to that produced by striking two full-blown ox-bladders together, but much louder; the strokes at first are slow and distinct, but gradually increase in rapidity till they run into each other, resembling the rumbling sound of very distant thunder, dying away gradually on the ear. After a few minutes' pause, this is again repeated; and in a calm day may be heard nearly half a mile off. This drumming is most common in spring, and is the call of the cock to his favourite female. It is produced in the following manner. The bird, standing on an old prostrate log, lowers his wings, erects his expanded tail, contracts his throat, elevates the two tuft feathers on the neck, and inflates his whole body something in the manner of the turkey-cock, strutting and wheeling about in great stateliness. After a few manœuvres of this kind, he begins to strike with his stiffened wings in short and quick strokes, which become more and more rapid. This is most common in the morning and evening, and by its means the gunner is led to the place of his retreat, though to those not acquainted with the sound there is great deception in the supposed distance, it generally appearing to be much nearer than it really is.

The pheasant begins to pair in April, and builds its nest early in May. This is placed on the ground, at the root of a bush, old log, or other sheltered and solitary situation, well surrounded with withered leaves. Unlike that of the quail, it is open above, and is usually composed of dry leaves and grass. The eggs are from nine to fifteen in number, of a brownish white, without any spots, and nearly as large as those of a pullet. The young leave the nest as soon as hatched, and are directed by the cluck of the mother, very much in the manner of the common hen. On being surprised, she exhibits all the distress and affectionate manœuvres of most other birds, to lead you away from the spot. The pheasant generally springs within a few yards with a loud whirring noise, and flies with great vigour through the woods, beyond reach of view before alighting, but with a good dog they are easily found. They are hard to kill. Sometimes in the depth of winter they approach the farm-house, and lurk near the barn, or about the garden. They have also been often taken young, and tamed, so as to associate with the fowls; and their eggs have frequently been hatched under the common hen; but these seldom survive until full grown. They are exceedingly fond of the seeds of young grapes; occasionally eat ants, chesnuts, blackberries, and various vegetables. They were formerly numerous in the vicinity of Philadelphia, but are now rare.

During the deep snows of winter, they have recourse for food to the buds of alder, and the tender buds of laurel, which makes their flesh unwholesome. This bird is eighteen inches long, and twenty-three inches in extent: bill a horn colour, paler below: eye reddish hazel, immediately above which is a small spot of bare skin of a scarlet colour: crested head and neck, variegated with black, red-brown, white, and pale-brown: sides of the neck furnished with a tuft of large black feathers, twenty-nine or thirty in number, which it occasionally raises: this tuft covers a large space of the neck destitute of feathers: body above, a bright rust colour, marked with oval spots of yellowish white, and sprinkled with black: wings plain olive-brown, exteriorly edged with white, spotted with olive: the tail is rounding, extends five inches beyond the tips of the wings, is of a bright reddish brown, beautifully marked with numerous waving transverse bars of black; is also crossed by a broad band of black within half an inch of the tip, which is bluish white, thickly sprinkled and speckled with black: body, white below, marked with large blotches of pale brown: the legs are covered half-way to the feet with hairy down of a brownish white colour: legs and feet pale ash: toes pectinated along the sides; the two exterior ones joined at the base as far as the first joint by a membrane: vent yellowish rust colour.

The female and young birds differ in having the ruff or tufts of feathers on the neck of a dark brown colour, as well as the bar of black on the tail inclining much to the same tint. See Wilson, Ornithol. Vol. VI. for a fine coloured drawing.

Fig. 4. *Pin-tailed Grouse. Tetrao alchata*, Linn. *Pterocles alchata*, Cuv.

This species is rather more than eleven inches in length: throat black: sides of the head and neck ashy yellow: the head, nape, rump, and upper tail-coverts, striped with black and yellow, with the back and scapulars of the same: the beak, the feet, and the claws are brown. It inhabits Africa; flies with rapidity, and a great distance at a time. It feeds on the seeds of plants, corn, and insects; drinks much, and arrives at the fountains, which are scarce, in large flocks. Its eggs are deposited in a nest composed of herbs and briars; they are four or five in number, olive-green spotted with black, resembling those of the plover.

Fig. 5. *Spotted Grouse. Tetrao Canadensis*, Linn. and Cuv.

This species abounds in the neighbourhood of Hudson's Bay and the northern parts of America, and does not differ materially in size from the last named, and the colours, differently placed, are nearly similar. The inhabitants of the places where this species is found, preserve them through the winter by freezing them, and when wanted they are thrown into water to thaw. The female lays five eggs.

Fig. 6. *Heteroclitous Grouse. Tetrao paradoxus*, Linn. *Syrrhaptes paradoxus*, Cuv.

The genus Syrrhaptes of Illiger resembles the gallinaceous type, as Cuvier has asserted. The tarsi are short, and are covered with feathers, as are also the toes, which are only three in number, and united at their base: the wings are long and pointed. The Tetrao paradoxus is the only one of the species known.

PLATE XXXV.—AMPHIBIA.

Genus Testudo of *Linn.*

Many errors have prevailed in the attempt to discriminate with precision the several species of tortoises; the general similarity being very great, and the individuals occasionally varying much in size, colours, &c. according to the different periods of their growth. These reptiles are distinguished by having the body inclosed in a shell or shells, so that the head, neck, legs, and tail, only, appear externally; and these are capable of being retracted in a greater or less degree. Tortoises have no teeth, and the margin of the mandibles is covered with horn, as in the beak of birds. They are very tenacious of life, and can remain months, and even years, without food.

Fig. 1. *Denticulated Tortoise. Testudo denticulata*, Linn. and Cuv.

The shell of this species is of a pale yellowish brown colour, measuring about four inches in length, and about three in breadth, and is covered on the disk by broad hexagonal and pentagonal scutella, which are of flattened form, granulated by small tubercles, the remainder marked by lines, or furrows. The edge of the shell consists of twenty-three pieces, all of which project in a serrated manner round the outline, those toward the ends being terminated by a sort of abrupt denticulated process. The convexity of the shell is moderate. Native of North America.

Fig. 2. *Green Speckled Tortoise. Testudo Europea*, Linn. *Emys Europea*, Cuv.

The speckled tortoise is of rather small size; the shell measuring about four or five inches in length. It is of an olive-brown, or blackish colour, smooth, flattish, or but slightly convex, and beautifully marked on the upper surface with very numerous, small, oblong, yellow specks, or very short streaks. The skin of the neck and breast of the animal is also spotted nearly in the same manner. The disk of the shell is composed of thirteen, and the margin of twenty-five pieces; the under shell is of whitish yellow, tinged towards the joints with brown; the head is ovate; the legs short and scaly; the feet webbed, the fore feet having five toes, the hind only four; the claws are sharp pointed; the tail nearly half the length of the body, and thin and scaly, marked with spots.

This elegant species is a native of many parts of Europe, being found in Italy, Sardinia, France, Hungary, &c. inhabiting lakes and muddy waters, and feeding on aquatic plants, insects, snails, and small fish. Its flesh is eaten, and the animal is occasionally kept in ponds, and fattened on lettuce, bread, &c. It deposits its eggs in sandy and sunny places.

Fig. 3. *Spotted Tortoise. Testudo guttata*, Linn. *Emys guttata*, Cuv.

The common spotted tortoise is found in all parts of the United States. The colour of the upper shell is black, with rounded yellow spots. The sternum is yellow, with large, dusky blotches. It is rather a small species, inhabiting rivers and lakes. The young are scarcely larger than a pigeon's eggs, and are very black, beautifully spotted with gold colour.

Fig. 4. *Painted Tortoise. Testudo picta*, Linn. *Emys picta*, Cuv.

This animal is found only in Canada and the northern and middle States. The shell is flattened and very smooth, and the plates are bordered with a yellow margin. It is fond of basking in the sun, upon rocks and logs, and instantly takes refuge in the water on the approach of danger. They are very voracious, destroying ducklings, &c. which they seize by the feet and drag under water.

Fig. 5. *Esculent Green Turtle. Testudo mydas*, Linn. *Chelonia mydas*, Cuv.

The marine tortoises, or *turtles*, as they are commonly called, are distinguished by their very large and long fin-shaped feet, in which are inclosed the bones of the toes; the first and second alone of each foot being furnished with visible or projecting claws, the others not appearing beyond the edge. The shield, as in the land tortoises, consists of a strong bony covering, in which are embedded the ribs, and which is coated externally by hard horny plates, in one or two species much thicker or stronger than those of the land tortoises.

The green turtle, so named, not on account of its being externally of that colour, but from the green tinge* which its fat frequently exhibits when the animal is taken in its highest state of perfection, may be considered as one of the largest of this genus, often measuring above five feet in length, and weighing more than five or six hundred pounds. Its shell is somewhat of a heart-shaped form, or pointed at the extremity, and consists of thirteen dorsal segments, or divisions, surrounded by twenty-five marginal pieces. Its colour is a dull palish brown, with deeper undulations, but not exhibiting those strong and beautiful colours which distinguish the Hawkbill turtle, which affords the tortoise-shell of commerce; but so much is the flesh esteemed, that here and in Europe it is regularly imported in considerable quantities to supply the luxury of the table.

CATCHING TORTOISE ON THE COAST OF CUBA.

(*a*) *The Green Tortoise* (*b*) *The Loggerhead Tortoise.*

The above wood-cut represents the manner in which the marine tortoises are caught on the coast of Cuba, and on parts of the South American continent. The Count de Lacepede, in his History of Oviparous Quadrupeds, has described the various modes in which the business of tortoise-catching is carried on; and we shall conclude this notice with an abstract of his account. It must be remarked that the turtle is a most important addition to the ordinary mode of victualling a ship; and that, therefore, the war in which the human race engages against them, is rendered absolutely necessary by the wants of navigators.

"In spite of the darkness which is chosen by the female tortoises for concealment when employed in laying their eggs, they cannot effectually escape from the pursuit of their enemies: the fishers wait for them on the shore, at the beginning of the night, especially when it is moonlight, and, when they come from the sea, or as they return after laying their eggs, they either dispatch them with blows of a club, or turn them quickly over on their backs, not giving them time either to defend themselves, or to blind their assailants, by throwing up the sand with their fins. When very large, it requires the efforts of several men to turn them over, and they must often employ the assistance of handspikes or levers for that purpose. The buckler of this species is so flat as to render it impossible for the animal to recover the recumbent posture, when it is once turned on its back.

"A small number of fishers may turn over forty or fifty tortoises, full of eggs, in less than three hours. During the day, they are employed in securing those which they had caught in the preceding night. They cut them up, and salt the flesh and the eggs. Sometimes they may extract above thirty pints of a yellow or greenish oil from one large individual; this is employed for burning, or, when fresh, is used with different kinds of food. Sometimes they drag the tortoises they have caught, on their backs, to inclosures, in which they are reserved for occasional use.

"The tortoise fishers, from the West Indies and the Bahamas, who catch these animals on the coasts of Cuba and its adjoining islands, particularly the Caymanas, usually complete their cargoes in six weeks or two months; they afterwards

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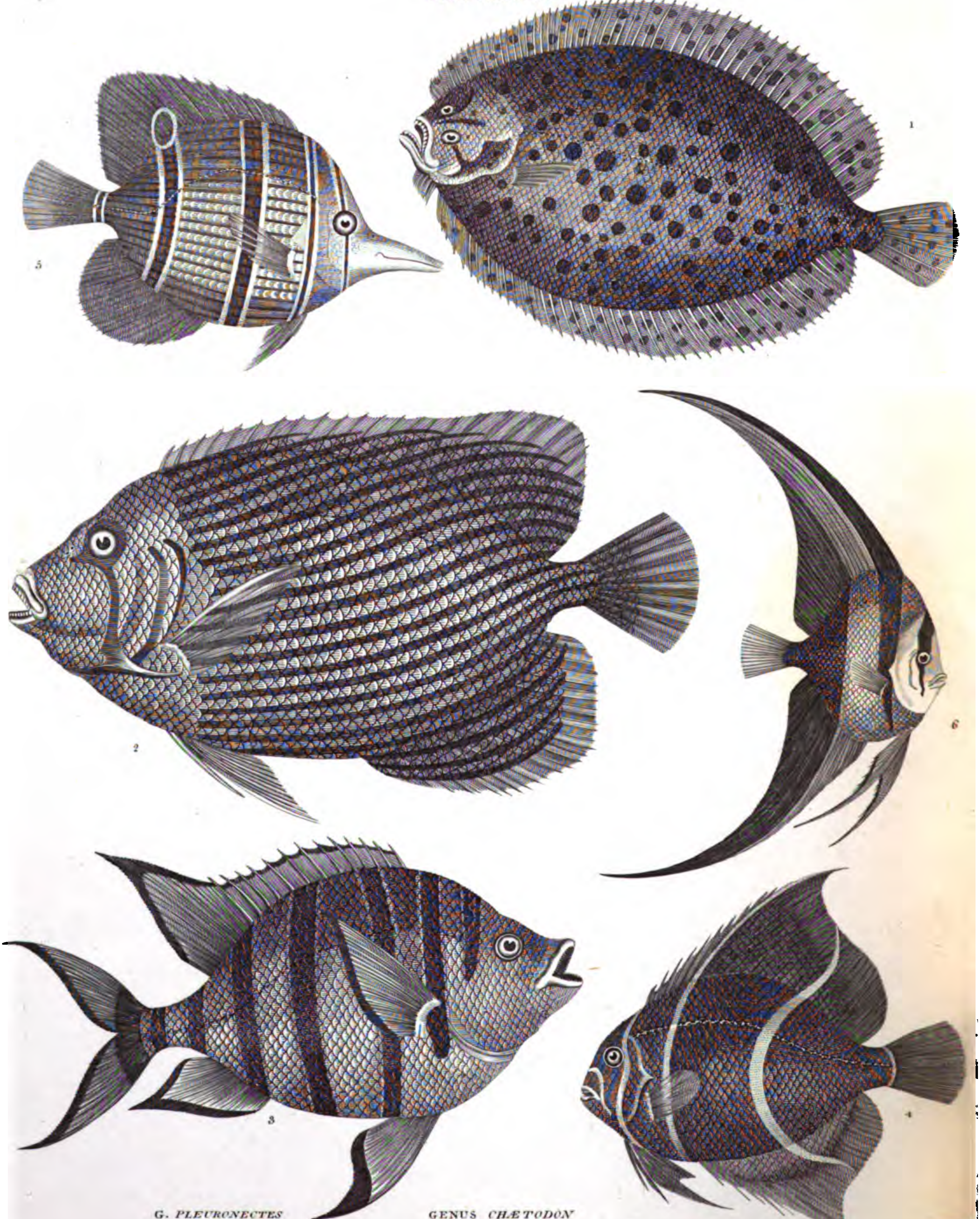
* This is supposed to be chiefly derived from the vegetable substances on which the animal feeds, and more particularly from the *Zostera marina*, or turtle-grass, of which it is particularly fond.

ICHTHYOLOGY.

ORDER THORACICI.



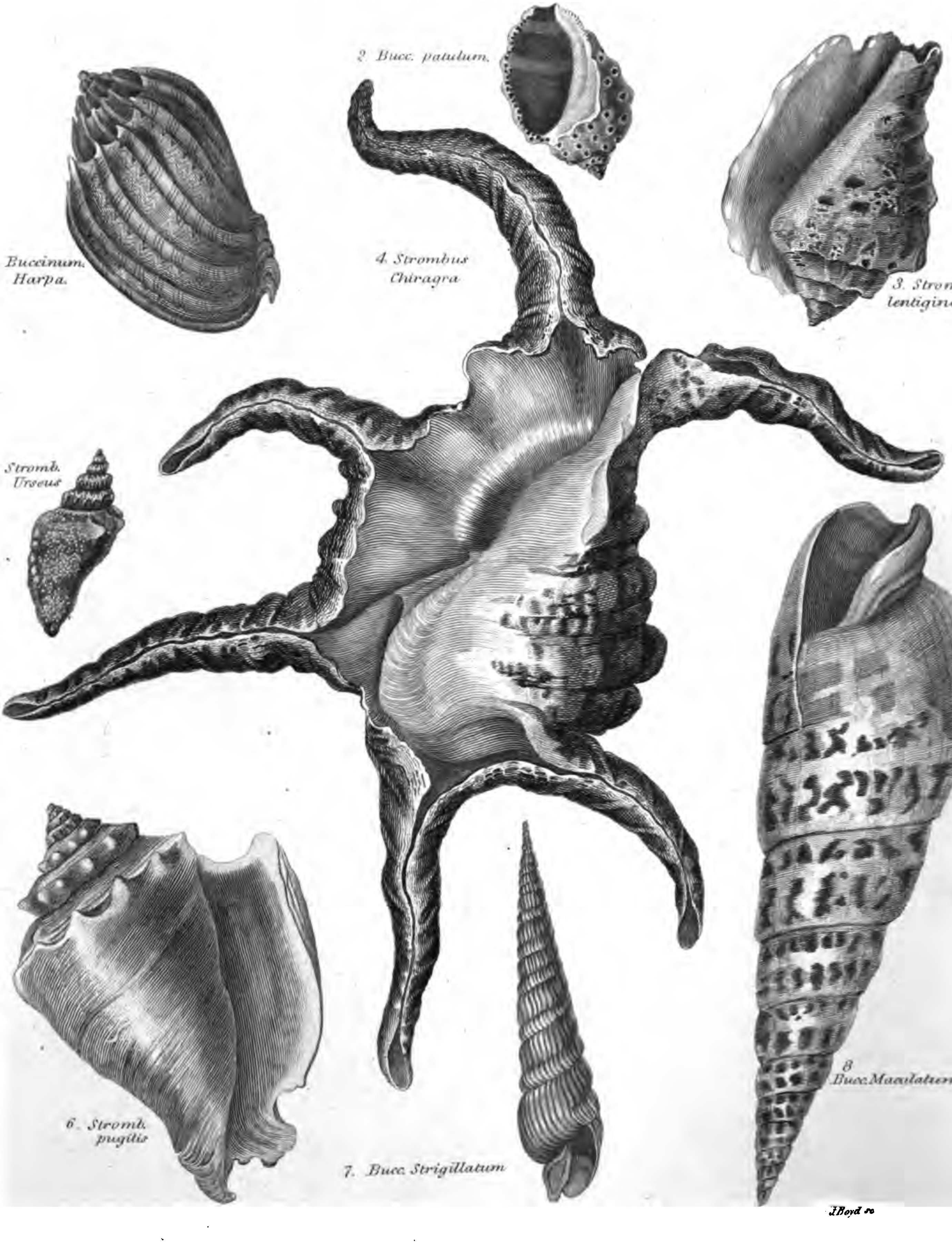
G. PLEURONECTES
(Flounder)

GENUS CHÆTODON

1. P. *punctatus* 2. C. *imperator* 3. C. *marginatus* 4. C. *arcuatus* 5. C. *rostratus* 6. C. *Teira*

CONCHOLOGY.

PLATE 37.


1. Buccinum Harpa.

2. Bucc. patulum.

3. Stromb. lentiginosus

4. Strombus Chiragra

5 Stromb. Urseus

6. Stromb. pugilis

7. Bucc. Strigillatum

8 Bucc. Maculatum.

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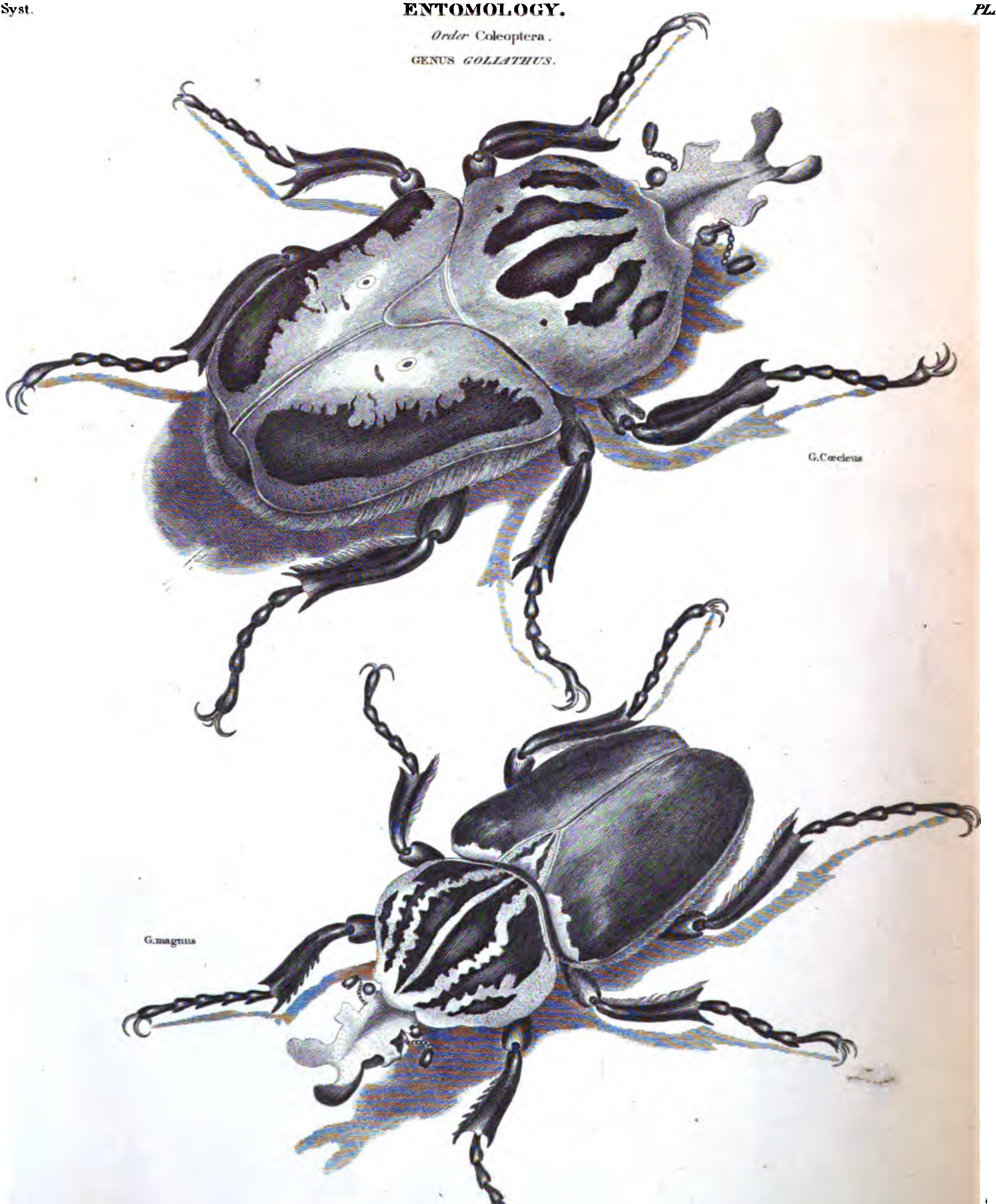
ENTOMOLOGY.

Order Coleoptera.

GENUS *GOLIATHUS*.



G.Cœcicus

G.magnus

return to their own islands, with the salted turtle, which is used for food both by the whites and the negroes. This salt turtle is in as great request in the American colonies, as the salted cod of Newfoundland is in many parts of Europe; and the fishing is followed by all these colonists, particularly by the British, in small vessels, on various parts of the coast of Spanish America, and the neighbouring desert islands.

"The green tortoise is likewise often caught at sea in calm weather, and in moonlight nights. For this purpose two men go together in a small boat, which is rowed by one of them, while the other is provided with a harpoon, similar to that used for killing whales. Whenever they discover a large tortoise, by the froth which it occasions on the water in rising to the surface, they hasten to the spot as quickly as possible, to prevent it from escaping. The harpooner immediately throws his harpoon with sufficient force to penetrate through the buckler to the flesh; the tortoise instantly dives, and the fisher gives out a line, which is fixed to the harpoon, and, when the tortoise is spent with loss of blood, it is hauled into the boat, or on shore."

Fig. 6. *Hawksbill Turtle. Testudo imbricata*, Linn. *Chelonia imbricata*, Cuv.

The testudo imbricata is so named from the peculiar disposition of its scales or laminæ, which commonly lap over each other at their extremities in the manner of tiles on the roof of a building. The neck is longer, and the beak narrower, sharper, and more curved than in other turtles, so as to bear a resemblance to the bill of a hawk, from whence its name. The fore legs are so long, that when the animal is laid on its back it is enabled by their assistance to recover its position, which no other turtle can do. It is a native of the Asiatic and American seas, and is sometimes found in the Mediterranean. General length, about three feet from the tip of the bill to the end of the shell; sometimes they have been found to measure five feet, and to weigh five or six hundred pounds.

The shell was anciently used as a shield. The flesh is not esteemed for food; the lamellæ, or plates of the shell, which are stronger and clearer than in any other kind, constituting the whole value of the animal, and affording the substance particularly known by the name of *tortoise-shell*. They are semi-transparent, and most elegantly variegated with whitish, yellowish, reddish, and dark brown clouds and undulations, so as when polished to become one of the most elegant articles for ornamental purposes.

This external coating is separated from the bony part which it covers by placing fire to the shell, and this is even performed while the animal is alive, by hanging him over a fire. The heat causes the plates to start, so as to be easily detached from the bone. These plates vary in thickness, according to the age and size of the animal, and measure from an eighth to a quarter of an inch in thickness. A large turtle affords from eight to fifteen pounds of this valuable article of commerce.

The Greeks and Romans appear to have been particularly partial to this elegant ornamental article, with which it was customary to decorate the doors and pillars of their houses, their beds, &c. In the reign of Augustus this species of luxury seems to have been at its height in Rome.

PLATE XXXVI.—ICHTHYOLOGY.

Fig. 1. *Pleuronectes punctatus*, Linn. *Rhombus punctatus*, Cuv.

This species of *flounder* is common in the northern seas of Europe, and is considered a great delicacy in Denmark.

Fig. 2. *Chætodon imperator*, Linn. *Holacanthus imperator*, Cuv.

This fish is yellow, with numerous longitudinal streaks, and about fourteen dorsal spines. It is a remarkably beautiful species, and inhabits Japan, where, according to Ruysch and Renard, it is said to be in high esteem for the table.

Fig. 3. *Chætodon saxatilis*, Linn. *Glyphisodon saxatilis*, Cuv.

Inhabits the Atlantic ocean.

Fig. 4. *Chætodon arcuatus*, Linn. *Pomacanthus arcuatus*, Cuv.

This species inhabits Brazil. Its body has three or four white, arched bands, and eight dorsal spines.

Fig. 5. *Chætodon rostratus*, Linn. *Chelmon rostratus*, Cuv.

The annexed plate gives an accurate representation of this singular fish, which inhabits the Indian seas. According to M. Hommel, inspector of the hospital at Batavia, it chiefly inhabits deep water, visiting the mouths of rivers only in the spawning season. The manner in which it takes its prey, though not peculiar to this species, is remarkable, and well authenticated. It lives principally on the smaller insects that fly near the surface of the water; and when it observes any one of these in its vicinity, it darts from its tubular snout a drop of water with such a certain aim as to bring the insect at once upon the water. The wealthy inhabitants of the Indian archipelago often confine the fish in glass vases, that they may witness this singular stratagem.

Fig. 6. *Chætodon teira*, Linn. *Platax teira*, Cuv.

Body with three black bands; dorsal and anal fins very long. It inhabits the Arabian and Indian seas.

PLATE XXXVII.—CONCHOLOGY.

Fig. 1. *Buccinum horpa*, Linn. *Harpa nobilis*, Lam.
Fig. 2. *Buccinum patulum*, Linn. *Purpura patula*, Lam.
Fig. 3. *Strombus lentiginosus*, Linn. Lam.
Fig. 4. *Strombus chiragra*, Linn. *Pterocera chiragra*, Lam.
Fig. 5. *Strombus urseus*, Linn. Lam.
Fig. 6. *Strombus pugilis*, Linn. Lam.
Fig. 7. *Buccinum strigillatum*, Linn. *Terebra strigillata*, Lam.
Fig. 8. *Buccinum maculatum*, Linn. *Terebra maculata*, Lam.

An intelligent writer has observed, that although shells form a part of creation not immediately subservient to the human economy, they are an interesting link in the great chain of nature; and when examined in reference to their amazing diversity of inhabitants, of form, and of colour, they cannot fail to arrest the attention even of the common observer.

Of the marine shells, some inhabit deep water, and are only procured by dredging; others prefer the sea-shore, and bury themselves in the mud or sand; and a third tribe is found floating on the surface of the ocean. The whole number of known recent species is about five thousand; while almost half as many fossil species have been discovered in the different strata of the earth's crust, wholly different from those now inhabiting the sea.

PLATE XXXVIII.—ENTOMOLOGY.

Upper figure. *Goliathus cæcius*, Lam. Cuv.
Lower figure. *Goliathus magnus*, Lam. Cuv.

The Goliah beetle is highly remarkable both in point of size and colour; it is over six inches in length, and has a rose-coloured thorax, marked with longitudinal black stripes, or variegations, and purple-brown wing-sheaths. The limbs are black and very strong. It is a native of Africa. A variety sometimes occurs, in which both the thorax and wing-sheaths are of a pale yellowish brown instead of rose colour, and are marked with black variegations.

PLATE XXXIX.—VERMES, *Linn.*

The genera GORDIUS, LUMBRICUS, and HIRUDO, of this plate, belong to the class ANNELIDES of Cuvier, and to the order ABRANCHIATÆ, which are thus defined: The Abranchiatæ have no apparent organs of respiration externally, but appear to breathe, some like the earth-worm, by the whole surface of the body, and others like the leeches, by internal cavities. They circulate red blood, and have a knotted nervous cord.

Upper figures. *Gordius aquaticus*, LINN. CUV.

The body resembles a thread. Inhabits fresh water, in the mud, and in inundated grounds, which they perforate in every direction.

Earth-Worm. Lumbricus terrestris, LINN. CUV.

Every one knows this familiar species; it has a reddish body, attains sometimes a foot in length, and has upwards of one hundred and twenty rings. It traverses the earth in every direction, and even eats it; it also feeds on roots, animal fragments, &c.

Of the two species of *leech*, HIRUDO, figured on the annexed plate, it may be briefly observed, that the

Hirudo muricata, LINN. *Albione muricata*, CUV. is a marine species that infests fishes, leaving a black mark where it has attached itself. Its body is round, tapering, tuberculated, and furnished with two horns on the head.

Hirudo geometra, LINN. CUV. fig. 1, 2, 3, 4, is elongated, of a yellowish colour, and with a pinnate dorsal line. It inhabits fresh water, fixing itself on the bodies of trout and other fishes, after the spawning season. Its motion is progressive, like the movement of a compass in measuring. Its length is only about eight lines, the three figures at the right lower angle of the plate representing a magnified view.

The *slugs*, LIMAX, are arranged by Cuvier in his class GASTEROPODA of the molluscous animals: the name is suggested from their crawling on a fleshy disk, situated under the abdomen. Two species are here given for illustration.

Limax maximus, LINN. CUV. This species is of a dark ash colour, variously spotted with black. It inhabits Europe, living in woods, gardens, and damp cellars. It attains a length of four or five inches.

Limax ater, LINN. CUV. *Black Slug*, so called from its colour. Its body is furrowed with deep wrinkles. It is common in the meadows and gardens of Europe, varying in length from an inch to five inches. It crawls slowly, leaving a kind of mucosity on the substances it touches.

The genus *Siphunculus* belongs to the class Echinodermata of Cuvier. Its body is cylindrical, elongated, and covered by a thick wrinkled skin. This animal is illustrated by the annexed figure of *S. nudus*, which inhabits the seas of Europe, concealing itself under stones. The fishermen use it for a bait. A very similar species (*S. edulis*) is eaten by the Chinese.

The genus *Planaria*, another of the lower links of animated nature, belongs to the class *Entozoa* of Cuvier, and inhabits both salt and fresh water. We illustrate this family by the *Planaria crenata*, which is a native of Denmark.

PLATE XL.—ANATOMY.

HUMAN SKELETON.

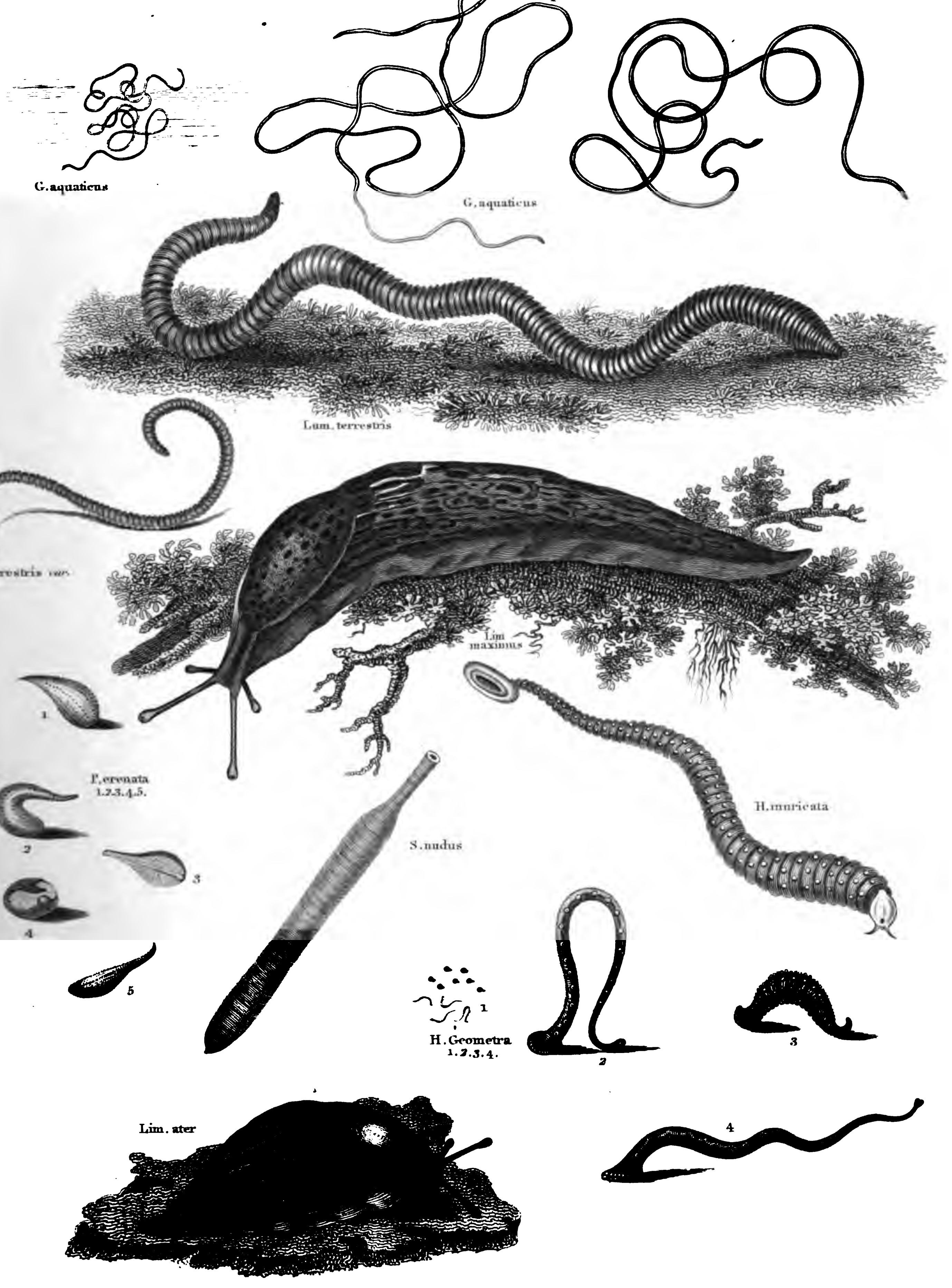
FIG. 1. Os frontis.
2. Parietal bone.
3. Temporal bone.
4. Mastoid process of do.
5. Zygomatic fossa.
6. Condyle of lower jaw.
7. Coronoid process of do.
8. Angle of do.
9. Mental protuberance, or chin.
10. Superior maxilla.
11. Malar bone.
12. Same.
13. Cervical vertebra.
14. First rib.
15. First false rib.
16. First lumbar vertebra.
17. Sternum.
18. Os innominatum.
19. Os pubis.
20. Os ischium.
21. Clavicle.
22. Scapula.
23. Acromion process.
24. Corocoid process.
25. Os humeri.
26. Tubercle of do.
27. Head of do.
28. Outer condyle of do.
29. Articular surface of do.
30. Internal condyle of do.
31. Radius.
32. Neck of radius.
33. Ulna.
34. Head of ulna.
35. Os scaphoides.
36. Os lunare.
37. Os cuneiforme.
38. Os pisiforme.
39. Trapezium.
40. Trapezoides.
41. Os magnum
42. Os unciforme.
43. Metatarsal bone of thumb.
44. " of first finger.
45. " of second do.
46. " of third do.
47. " of fourth do.
48. First bone of thumb.
49. Last do.
50. First joint of thumb.
51. First bone of fore finger.
52. Second " " "
53. Third " " "
54. First bone of middle finger
55. Second " " "
56. Third " " "
57. First bone of ring finger.
58. Second " " "
59. Third " " ".
60. First bone of little finger.
61. Second " " "
62. Third " " "
63. Os femoris.
64. Trochantur major.
65. do. minor.
66. 67. } Condyles of os femoris.
68. Patella.
69. Tibia.
70. 71. } Head of tibia.
72. Tubercle of tibia.
73. Maleolus internus.
74. Fibula.
75. Head of fibula.
76. Maleolus externus.
77. Astragalus.
78. Os calcis.
79. Scaphoides.
80. 81. 82. } Three cuneiform bones.
84. 85. 86. 87. 88. } Metatarsal bones of foot.
89. 90. } Bones of the great toe.
91. 92. 93. } Bones of second toe.
94. 95. 96. } Bones of third toe.
97. 98. 99. } Bones of fourth toe.
100. 101. 102. } Bones of fifth or little toe.

SKELETON.

The whole number of bones composing the human skeleton is two hundred and ten; they are framed as a basis for the whole system, fitted to support, defend, contain the more delicate and noble organs. They are the most permanent, unchangeable parts, bearing exposure to the seasons with little change, and remaining for ages the memorials of the dead. Thus, the bones of the ancient Egyptians entombed at Thebes and other places, differ in no anatomical respect from our own, although historical evidence proves them to have been placed in their present depositories considerably more than two thousand years ago.

VERMES.

Genus Gordius . G.Lumbricus G.Hirudo_G.Limax.
G.Planaria. G.Sipunculus.



ANATOMY.

Skeleton.

Osteology.

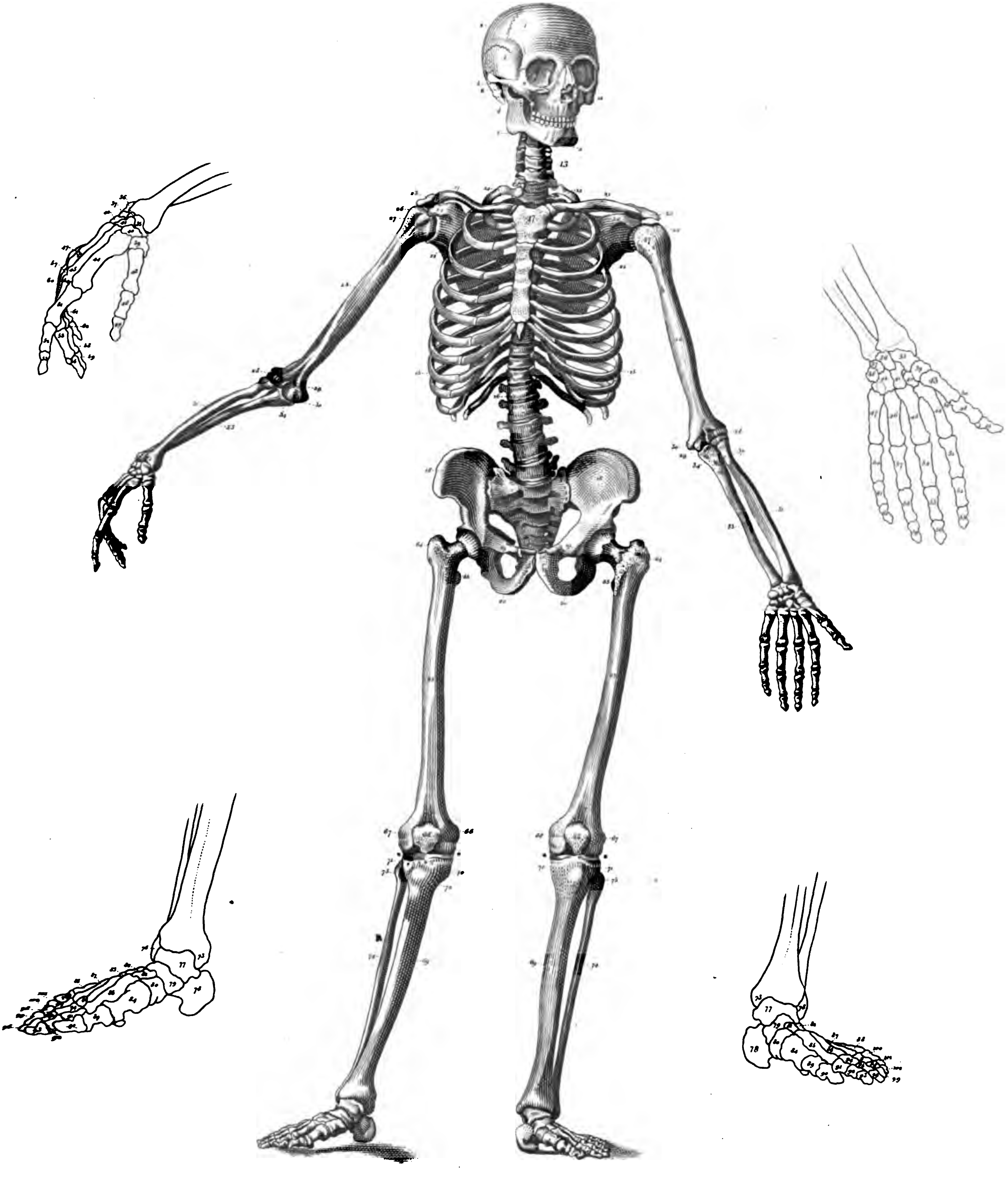
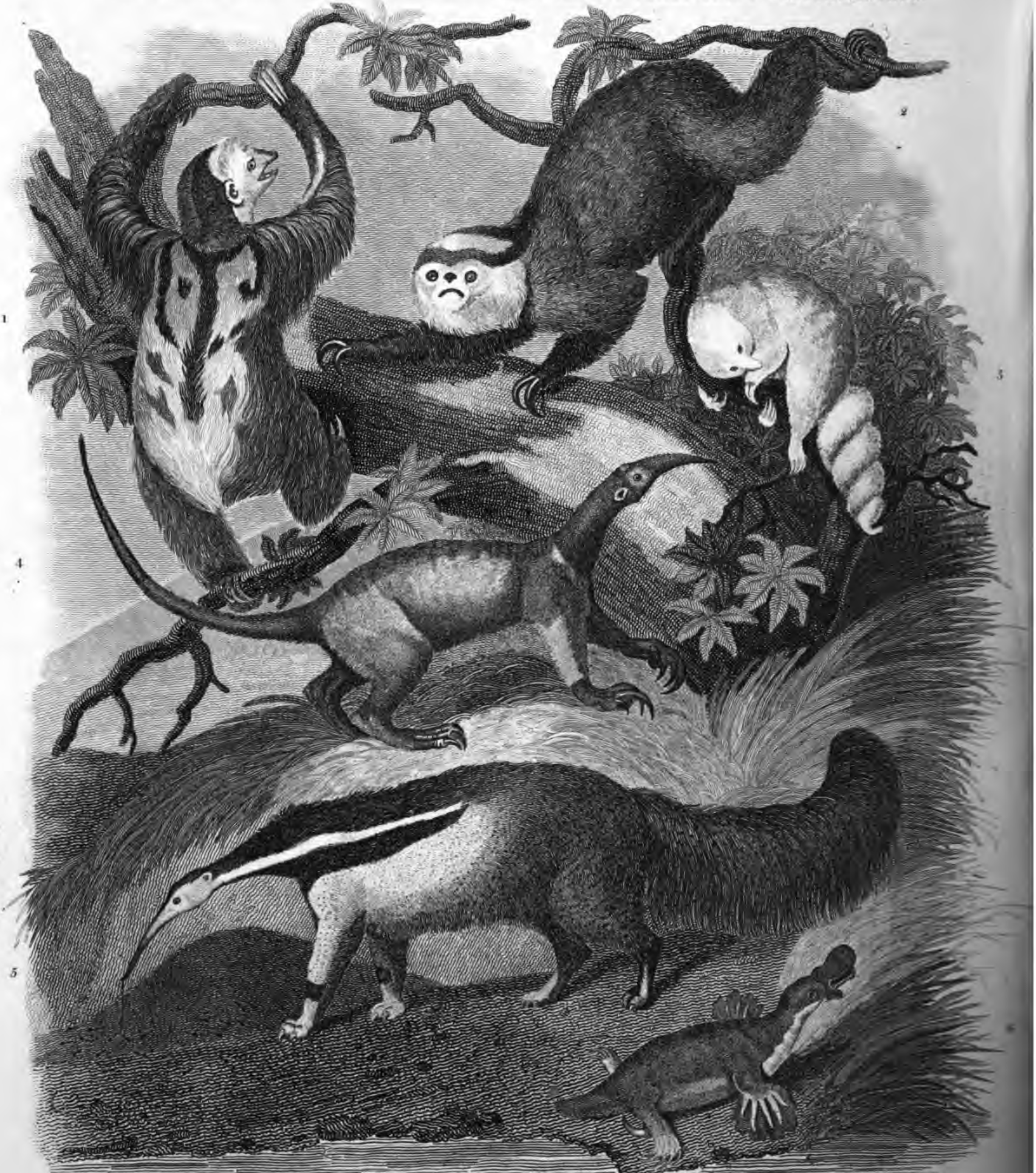


PLATE 41.

QUADRUPEDS.

CLASS MAMMALIA. ORDER BRUTA. GENUS BRADYPUS. GENUS MYRMECOPHAGA. GENUS ORNYTHORINCHUS.



1. Bradypus Tridactylus. Three toed Sloth. 2. B. Didactylus Two toed Sloth. 3. Myrmecophaga Didactyla. Two toed or little Ant eater. 4. M. Tetra Dactyla. Four toed Ant eater. 5. M. Jubata. Great Ant eater. 6. Ornythorinchus Paradoxus. Duck billed Ornythorinchus.

PLATE XLI.—QUADRUPEDS.

FIG. 1. *Three-toed Sloth. Bradypus tridactylus*, LINN. CUV.

The body of the three-toed sloth is thick, about the size of a cat, and of a very uncouth appearance; the feet are small, but furnished with very strong, large, much curved, and sharp pointed claws; the head is small and round; the face naked; the eyes are small, black, round, and nearly covered by the hair of the forehead, which hangs over them; long hair surrounds the whole face and chin, which gives the animal a singular appearance. The colour of the hair is grayish brown, and it is very coarse in its texture. The three-toed sloth lives generally on the tops of trees; and if they are high, so slow is its progressive motion, that it will take two whole days to ascend, and as many to get down again, which it never does till it has stripped the tree of its fruit, blossom, and leaf. It is said, that, to save the trouble of a laborious descent, which it would otherwise be obliged to make, it suffers itself to fall to the ground; its tough skin and thick coarse hair sufficiently securing it from any unpleasant consequences in its fall.

The voice of the sloth is said to be so inconceivably singular, and of such a mournful and melancholy tone, as, taken in conjunction with the peculiarly doleful cast of the features, to create a mixture of pity and disgust in those who look on it; and the horrid yell it makes, frightens away animals which attempt to prey upon it. But this is not its only refuge, for its strength of limb is so great, that it is capable of seizing a dog with its claws, and holding it in spite of every effort to escape, till it dies of hunger. Kircher assures us, that its powers in this respect have been exemplified by the very singular experiment of suffering one, which had fastened itself to a pole, to remain in that situation, without any sustenance, upwards of forty days. This singular animal is an inhabitant of the hotter parts of South America.

FIG. 2. *Two-toed Sloth. Bradypus dydactylus*, LINN. CUV.

This species is also a native of South America; and it is asserted, on good authority, that it is likewise found in some parts of India, as well as in the island of Ceylon. In its general appearance, as well as in size, it bears considerable resemblance to the former species: it is, however, somewhat more slender in its shape; covered with smoother or less coarse and harsh hair; and is of a more uniform or less varied tinge; having no marks or shades of black and ferruginous, as in the former; and, in particular, is strikingly distinguished, as a species, by having only two claws on the fore feet: it is also a much more active animal, and, even when imported into Europe, has been known, according to the testimony of the Count de Buffon, to ascend and descend from a tall tree several times in a day; whereas the three-toed sloth with difficulty performs that operation in a whole day; and can scarce crawl some hundred yards in the space of many hours. The disposition of the hair on the head of the two-toed sloth differs also from that of the former animal, and is directed immediately backwards, without being in the least reversed round the front as in that species.

FIG. 3. *Little Ant-Eater. Myrmecophaga didactyla*, LINN. CUV.

This is an animal of great elegance. It is not superior in size to a squirrel; measuring little more than seven inches from the nose to the tail, which is longer than its body and head: the head is small; the snout sharpened and slightly bent downwards: the legs are short; the fore feet have only two claws on each, the exterior one much larger and stronger than the interior: on each of the hind feet are four claws of moderate size: the ears are very small, and hid in the fur: the eyes are also small. The whole animal is covered with a beautiful soft, and somewhat crisped or curled, fur, of a pale yellow colour, or rather yellow-brown: the tail, which is very thick at the beginning or base, gradually tapers to the tip; and the lower surface, for about the space of four inches from the tip, is bare, the tail being prehensile, and the animal commonly residing on trees, and preying upon ants, by means of its long tongue, in the manner of other species. It is a native of Guiana.

FIG. 4. *Four-toed Ant-Eater. Myrmecophaga dactyla*, LINN. CUV.

This species, which is far superior in size to the former, has a long slender nose, bending down a little: the mouth is black: the eyes small: the ears small and upright. The general colour of this animal is a palish yellow-brown; the hair somewhat shining, and of a hard nature: on each side of the neck is an oblique black or dusky band, crossing the shoulders, and passing toward the lower part of the back: the tail, which is covered with longer hair than the back, is thickish at the base, but tapers towards the end, where it is nearly bare, having the same prehensile power as in some of the monkeys. On each of the fore feet are four toes, armed with strong claws, the middle ones extremely so. On the hind feet are five claws, small, in comparison with the former. The length of the animal, from nose to tail, is one foot seven inches; of the tail ten inches. It inhabits the same parts of South America with the Great Ant-Eater, and its manners are similar. It also climbs trees, and occasionally clings by its tail to the branches.

FIG. 5. *Great Ant-Eater. Myrmecophaga jubata*, LINN. CUV.

This remarkable quadruped is about five feet and a half, from the point of the nose to the root of the tail; and its height about two feet. The tail itself is upwards of two feet and a half. The body is covered with very coarse shaggy hair; and the tail is furnished with long, flowing, black hair, somewhat like that of a horse's mane. Its head is small, with a very long snout. The eyes are small and lively; the ears short and round. The shoulders and fore legs are thick and muscular. The general colour of the hair is deep gray, with a very broad band of black, running from the neck towards the flanks, and tapering to a point, with a white margin at its upper surface.

The great ant-eater is a native of Brazil and Guiana. It sleeps the principal part of the day, and feeds in the evening. Its food consists principally of ants. When he discovers an ant-hill, he scratches it up with his powerful claws, and then throws out his tongue, which is a retractile, like an earth-worm. He places this organ in the midst of the disturbed colony, and as it is covered with a tough, slimy saliva, thousands stick to it, when he draws it into his mouth and swallows them. This operation he repeats, till he has consumed the whole community. Wood-lice and wild honey are also favourite articles of food with him. In quest of these, he frequently ascends lofty trees, which he does with great facility, owing to the great length of his claws.

The great ant-eater is a good swimmer; and when he crosses a river, his tail is always elevated above his back.

The female produces one young at a time; and it is said to take four years in arriving at maturity.

FIG. 6. *Duck-billed Ornithorynchus. Ornithorinchus paradoxus*, LINN. *O. rufus*, DESMAREST.

Of all the mammiferous animals with which we are acquainted, this is certainly the most singular, exhibiting to external appearance the bill of a duck, the body of an otter, the feet of a turtle, and the spurs of a cock; it actually seems to combine the properties of quadruped, bird, and reptile. The body is covered with fur like that of a beaver; tail flat, short, with a tufted termination, and has the same kind of fur. The legs short, and ending in a broad web; fore feet naked; the hind hairy above. The eyes very small, and hidden. No animal has ever excited the curiosity of naturalists more than this. At first it was considered as an imposition, from its conformation being so different from anything mankind had any notion of. It is a native of the marshy grounds of New Holland.

PLATE XLII.—QUADRUPEDS.

Mammalia. *Canis. The Dog.*

Linnæus, in his System of Nature, has placed the dog as the second genus of the third order of mammiferous animals, or those which suckle their young by means of lactiferous teats.

The characters of the third order, Ferae, are as follows:—The fore teeth are conic, usually six in each jaw; the tusks are longer, the grinders have conic projections; the feet have claws, which are usually subulate, or awl-shaped; they feed on carcasses, and prey on other animals.

The characters of the genus Canis, or Dog, are, six cutting teeth in the upper jaw; those at the sides longer than the intermediate ones, which are lobated. In the under jaw there are also six cutting teeth, the lateral ones lobated; there are four canine teeth, one on each side, both above and below, and from six to seven grinders. The specific characters of the *Canis Familiaris*, or Common Dog, are, the head is carinated, or keel-shaped on the crown, the lower lip is hid by the upper, indentated and naked at the sides; the tongue is smooth; on the upper lip are five or six rows of whiskers; the nostrils are turned out into a crescent-shaped furrow; the upper margin of the ears is reflected and posteriorly doubled; the anterior margin is three-lobed, and there are seven or eight hairy warts on the face. There are ten teats; four of them pectoral, and six abdominal; the feet are subpalmated, with claws on the toes, which are long, a little curved, and not retractile within the toes, as is the case with those of the cat.

He has, besides the above Linnæan anatomical distinctions, other general characters which are peculiar to his tribe. He delights in associating with man, feeds on flesh carcasses, and farinaceous vegetables, digests bones, is vomited by eating grass, which he does instinctively; drinks by lapping, runs obliquely, resting upon his toes, perspires by his tongue, which he lolls out when warm; when lying down turns often round: hears in his sleep, and dreams frequently. Of all animals the most faithful; fawns on the appearance of his master, and defends him; runs before him on a journey, and if the road divides, looks back, and generally waits to see which he takes; will turn to the branch to which he is directed from a distance; his sense of smell is exquisite.

Cuvier, in his Animal Kingdom, gives the following character of the dog, which differs little from that of Linnæus, except in his new and more distinct terminology.

The upper cheek teeth are six on each side, the three first are sharp, trenchant, called by Cuvier false molars, a carnivorous tooth, has two cutting lobes, beyond which on each side, are two flat teeth, and two tuberculous teeth behind; furnished with longish nails, obtuse and not retractile, and the mammæ are ventral; the eye-pupils are circular and diurnal, or formed for seeing by day.

Of all animals known to mankind, the dog is the most diversified in form, size, properties, intellect, and propensities; agreeing only in one peculiarity,—his constant attachment and fidelity to his master. The oldest writers mention the dog as an associate of man; he is spoken of by Aristotle, Albertus, Pliny, Blondus, Galen, Artemidorus, Arnobius, and others.

Solinus and Acleanus inform us that there was a nation in Ethiopia called *Nubae*, which held the dog in such high estimation that they gave to him the honour of a king, and they had no other! We find also a star named after this animal, *Sirius*, or *Canicula*, the Dog-star; and the thirty days, or thereabouts, during which this star rises with the sun, are termed the dog-days, from a supposed influence on the canine tribe, attributed to the extreme heat of the weather during that period. This notion is continued to the present day. Dogs were employed to guard the temples of the Romans, and because they failed to give warning when the Gauls attacked the capital, a certain number of them were annually carried through the city, and then impaled on a cross.

By domesticating this intrepid, honest, faithful, sagacious, and affectionate animal, man has secured the most necessary and certain means of conquest and dominion over other creatures. By the exquisite irritability of his olfactory nerves, the dog is enabled to pursue, steadily and unerringly, all other animals; he can trace with exactness every winding and turning, till, by his strength and perseverance, he at last overtakes, and speedily overcomes and destroys them; and the fury of his natural hatred is abated by the blood of the animal.

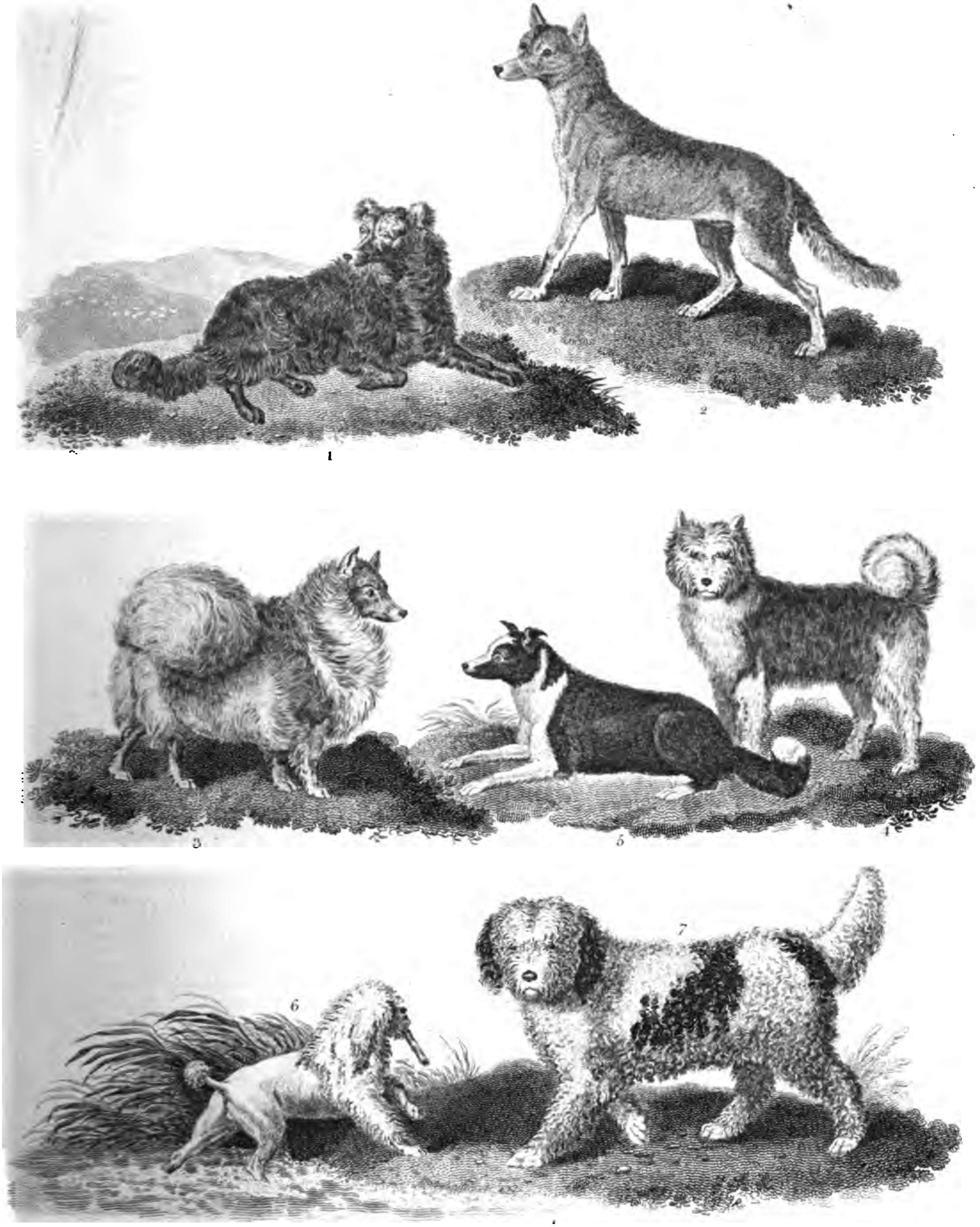
It is now almost universally believed by naturalists, that the shepherd's dog is the parent stock from which the endless varieties of this species have sprung. Naturalists have formed a genealogical table of thirty-seven distinct races, originating with, and diverging in different lines from, that dog; and, although this table rests only on hypothesis, yet there are strong grounds for believing it to be tolerably correct,—thus, with all its innumerable varieties, shapes, habits, appetites, and propensities, and in whatever country he inhabits, it appears to be but *one species*, under different modifications of form, occasioned by the variety of climates in which it has been produced. We find that both the extremes of heat and cold have the effect of altering the human species; that as we approach both poles, man diminishes in stature, and that it is in the more temperate regions where he is found most perfect, not only in physical symmetry and power, but also in mental capacity. The same influence exerts itself on dogs and other animals.

The unerring sagacity, faithful and unalterable attachment, and other inherent virtues of the different races of dogs, hold up to man himself an aggregate of distinguished excellence, much superior, when justly estimated, to many of the lower orders of his own species. Endowed by the all-wise Dispenser of good with a variety of faculties and social habits, and of other qualities, excellent of their kind, which render him perhaps superior, in point of intellect, to every other animal, and which are calculated to attract the admiration and regard of the human species, he is possessed of sagacity which seems to reach far beyond what may be termed mere instinct; for we have many records of his actions which evince no small degree of reasoning. Possessed of more docility and mental pliability than any other animal, he is fitted in an eminent degree to receive the instructions and execute the orders of his master, as soon as understood by him. His regard and sociability are not confined to his master alone, but are in general extended to all the branches of his family; and not only this, but he acquires an intimate knowledge of the customs, manners, and habits of all by whom he is surrounded; and with a discrimination equal in many points to human intelligence, accommodates himself to each. United to his mental capacity, his senses of hearing, smelling, and seeing, are astonishingly acute. That of smelling, he possesses in a degree beyond our conceptions. That he can trace the footsteps of those with whom he is acquainted, and that even for miles, is well known.

The strict vigilance with which he guards property intrusted to his charge, is not the least important feature in his character. He seems to be quite sensible that it is under the cloud of night that depredators begin to prowl about; and hence he is more alert than during the day, in watching property committed to his care. All his energies seem roused, and his attention is more than doubled; on which occasion, there seems no bounds to his courage, and he will only desert his charge with his life. When strangers approach his post, he intimates his presence and suspicious anger in a manner at once determined and threatening; and such is his fidelity to his charge,

QUADRUPEDS.

Linn Syſt. *Class* Ist. Mammalia_*Order* IIIrd. Feræ_*Genus.* XV Canis. *PLATE* 42 *of Order* F3d.



1. **Shepherds Dog**_ 2 Auſtralaſian Dog 3. Pomeranian Dog 4. Siberian Dog 5. Iceland Dog. 6. Small Barbet_7. Great Barbet or Water Dog.

G. Murray fc.

that no flattery or feeding will divert him from it. Instances have even been known of dogs seizing workmen, with whom they were well acquainted, while in the act of entering their masters' premises during night for the purpose of plunder. It is no less surprising how soon dogs become acquainted with people, who have occasion to pay frequent visits to the family. The butcher, baker, &c., he will receive with civility, and even attention; but mendicants, and ill-dressed people, he always regards with a suspicious eye, and keeps them at a proper distance from his master's domicile; while, on the other hand, he will seldom bark at well-dressed people.

Without the vices of man, nature has formed the dog with an ardour and purity of attachment, which, when once matured, remains unsullied and inviolable. His whole ambition seems to be to execute the commands of his master, and to yield implicit obedience to his every wish, while, at the same time, he has a great dread of giving offence. His whole actions are marked by zeal, vigour, and gratitude for the little kindnesses he receives at the hand of his master. He seems perfectly sensible of favours bestowed on him. Under correction, whether deserved or not, he in general displays a degree of firmness by submitting to, and not avoiding the chastisement; while, with conciliating and impressive looks and supplications, he endeavours to allay the wrath of his chastiser, and will lick the hand by which the blows are inflicted. Every kindness he receives from his master is remembered, while his often undeserved punishment is forgotten. But, on the other hand, his conduct to strangers is reversed, as he will boldly protect himself against an unmerited injury, and will seldom forget it.

It is a well-known fact, that dogs will seldom or never bite an infant, even though beaten or abused by it. The dog is sensible of an error; and, if caught in one, will slink away with his tail hanging down, as if conscious of guilt; in which case, he will retreat from a stranger as soon as from his master.

The dog, possessed of beauty and strength in his formation, is also extremely swift, and from the capacity of his chest, can continue the chase for a very long time without being worn out; besides, his sense of smelling, which he so eminently possesses, enables him to pursue all other animals with nearly unerring certainty. He seems to be endowed with a natural aversion to almost every other quadruped; yet he is so pliable in his nature, and, like man himself, so much a creature of habit, that his natural antipathies are easily overcome. His natural hatred of the cat is well known; yet we have innumerable instances of their occupying the same couch in perfect harmony, and even with a strong attachment for each other; and, what is remarkable, this antipathy is only overcome in so far as regards the individual which is attached to the family; for he will instantly pursue another which comes in his way, and treat him with all the severity possible.

The dog is born with its eyes closed; they do not become opened until the tenth or twelfth day; its teeth begin to change about the fourth month, and its growth is perfected in two years. The female generally has a litter of from six to twelve pups. The dog seldom lives beyond fifteen years.

Fig. 1. *Shepherd's Dog. Canis domesticus*, Linn.

This dog is distinguished by his upright ears and sharp muzzle, with great villosity of the under part of the tail, as well as on the back of the fore legs. The body is rather long, covered with a thick woolly-like hair, and the legs are rather short. There is a singularity in the feet of the shepherd's dog; all of them having one, and some of them two, superfluous toes, which appear destitute of muscles, and hang dangling at the hind part of the leg, more like an unnatural excrescence, than a necessary part of the animal. But as "nature has made nothing in vain," these must certainly be destined for some useful purpose with which we are not yet acquainted. These dew-claws are likewise sometimes found in the spaniel, pointer, and cur dog; in the two former they are generally cut off at an early stage, as they are an impediment in covers, and frequently get torn, thereby creating sores, and sometimes rendering the dog unfit for use.

This useful and intelligent animal is one of the most placid, obedient, serene, and grateful members of the canine race. He is ever alive to the slightest indication of his master's wishes, prompt and gratified to execute them; and he seems to enjoy the greatest delight when employed in any kind of useful service. Formed by nature with an instinctive propensity to industry, he is never more pleased than in exerting his talents for the benefit of man, and in giving constant proofs of his inviolable attachment.

The native calmness, patience, and devoted faithfulness of the shepherd's dog, render him insensible to all attractions beyond the arduous duties connected with the flock under his care. When once properly trained, he not only becomes perfectly acquainted with the extent of his beat, but also with every individual in the flock; he will most correctly select his own, and drive off such as encroach on his limits. A word or signal from the shepherd, will direct the dog so as to conduct the flock to any point required, and that signal he will obey with energy and unerring certainty. Without his aid, large flocks could scarcely be collected in those extensive and precipitous tracts of mountain land where the sheep delight to graze, and which, in many places, are quite inaccessible to man. The breed is preserved in the north of England with the greatest attention to purity. He is naturally hardy, and the least voracious of the species.

Although left alone for hours, a well-trained dog always keeps the flock within the limits of a made road, even although there are no fences.

Anecdote. The most extraordinary anecdotes are related of this animal. We are indebted to Mr. Hogg, the Ettrick Shepherd, for the following. On one occasion, about seven hundred lambs under his care at weaning time, broke up at midnight, and scampered off, in three divisions, across the neighbouring hills, in spite of all that he and his assistant could do to keep them together. "Sirrah," cried the shepherd to his dog of that name, "my man, they're a' awa." The night was so dark that he could not see Sirrah; but the faithful animal heard his master's words, and, without more ado, he silently set off in quest of the recreant flock. Meanwhile, the shepherd and his companion did not fail to do all in their power to recover their lost charge; they spent the whole night in scouring the hills for miles round, but of neither the lambs nor Sirrah could they obtain the slightest trace. They were about to return to their master and inform him that they had lost his whole flock of lambs, and knew not what was become of one of them. "On our way home, however," says Mr. H., "we discovered a lot of lambs at the bottom of a deep ravine, and the faithful dog in front of them, looking round for some relief. What was our astonishment when we discovered that not one lamb of the whole flock was wanting! How he had got all the divisions collected in the dark is beyond my comprehension: if all the shepherds in the forest had been there, they could not have effected it with greater propriety."

Fig. 2. *Australasian Dog.*

Of this animal's habits but little appears to be accurately known.

Fig. 3. *Pomeranian Dog. Canis Pomeranus*, Linn.

The Pomeranian dog has also been called the Wolf dog, by some authors. He has the hair short on the feet, head, and ears, but long and silky on the body, breast, shoulders, thighs, and tail, which is extremely bushy and spiral. His fore legs are somewhat feathered. His general colour is white, black, gray, or of a yellowish fawn. His head is long and sharp, with erect pricked ears, and full expressive eyes. He is used as a guardian for flocks, and is a powerful enemy to the wolf, whom he seldom fails to overcome.

Fig. 4. *Siberian Dog.* *Canis Sibericus*, Linn.

This dog appears to be nearly related to the Pomeranian, being very like it in general appearance, except that it is covered with longish hairs all over the legs, even on the head and paws. Much used in Kamtschatka for drawing sledges over the frozen snow.

Fig. 5. *Iceland Dog.* *Canis Islandicus*, Gmelin.

This animal is of great use to the natives of Iceland, especially while travelling in winter through the snowy, trackless, and extensive deserts. His instinctive sagacity forewarns his master of a coming storm, by skipping and jumping in a manner well understood.

Fig. 6. *Small Barbet.* *Canis Aquaticus Minor.*

This is a most lively, active dog, with an acute sense of smell, and is very susceptible of instruction of almost any kind. Its general colour is white, although individuals are sometimes found with black patches over various parts of their bodies. He is very fond of diving.

Fig. 7. *Great Barbet.* *Canis Aquaticus*, Linn.

The great rough water-dog has long curly hair, is web-footed, swims with great ease, and is extremely useful in the sport of shooting aquatic birds. He has many of the qualities of the land spaniel. He has a great liking to fetching and carrying, and such is his exquisite sense of smell, that he will find a particular stone thrown by his master to the bottom of a river. He dives with astonishing dexterity, and is particularly serviceable on board of ships, as he leaps from the side of the vessel after any article that has fallen overboard, and is very useful for recovering birds shot from the deck. Above all, he is lively, playful, good-tempered, and much attached to his master.

Monsieur R., in the days of Robespierre, at the time of his imprisonment, owned one of the most faithful water-dogs on record. He accompanied him to prison, to the guillotine, and followed the body to the grave, where he passed the first night, the next day, and the second night. He refused all food, and actually died in the act of removing the earth to come at the body of his friend.

PLATE XLIII.—ORNITHOLOGY.

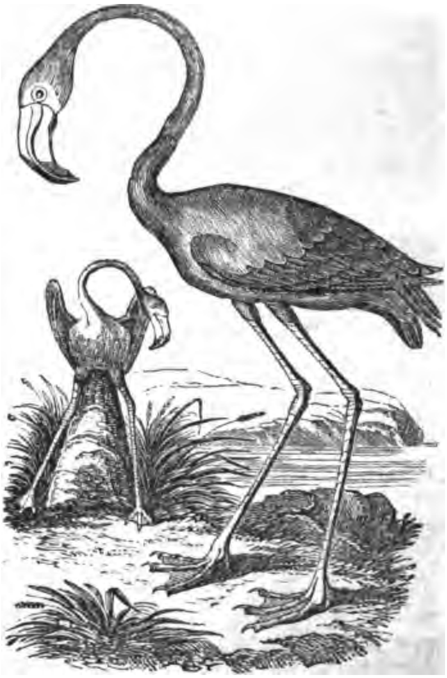
Order Grallæ, Linn. and Cuv.

These birds run about on the sea shores, and the borders of lakes and rivers: they subsist upon anneleides, and small fishes and their fry, reptiles, and aquatic insects, the cranes excepted, which live on beetles, larvæ, and seeds; they live in pairs, but during their migrations, which take place regularly, they associate in flocks. In many of the genera the species moult and change their plumage regularly twice a year; in others they always retain the same plumage, undergoing the proper moult.

Fig. 1. *Red Flamingo.* *Phœnicopterus Ruber*, Linn. and Cuv.

The body of this very extraordinary bird is scarcely larger than that of a goose, while its legs and neck are of such disproportionate length, that the bird measures, from the extremes of the beak to the end of the claws, no less than six feet. Beak four and a quarter inches long, partly of a blood red, with its tip black; prevailing colour of the plumage, deep red. These birds inhabit the warm climates of Africa, Asia, and America, and are sometimes seen at Marseilles, &c. Except in breeding season, they are found in flocks, and, at a distance, appear like a regiment of soldiers. Their food consists principally of small fish. When feeding, one of their number stands as sentinel, and upon the appearance of the least danger, he gives a loud scream, and instantly the whole flock is on the wing, all joining in the noise, which has been compared to the sound of a trumpet.

The great length of the legs of flamingoes obviously unfits them for sitting or squatting upon a low or flat nest, and hence, according to Linnæus and others, they select for their nests some projecting shelf of a rock, upon which they can sit astride, like a man on horseback, without bending their legs. Dampiér declares, that "they make their nests in the marshes, where they find plenty of slime, which they heap with their claws, and form hillocks resembling little islets, and which appear a foot and a half above the water. They make the base broad, and taper the structure gradually to the top, where they have a small hollow to receive their eggs. When they lay or hatch, they stand erect, not on the top, but very near it, their feet on the ground and in the water, leaning themselves against the hillock, and covering the nest with their tail."



A similar account is given by Catesby, who compares the flamingo sitting across its nest, to a man on a desk-stool with his legs hanging down. Labat found great numbers of these nests; he says, "they resembled truncated cones, composed of fat earth, about 18 or 20 inches high, and as much in diameter at the base." M. Descourtlitz represents the standing position of the female, while hatching, as so fatiguing that the male is obliged to relieve her, though he does so with great reluctance.

A more entertaining subject than the architecture of birds can scarcely be found in the range of natural history.

Fig. 2. *Roseate Spoonbill.* *Platalea Ajaja*, Linn. and Cuv.

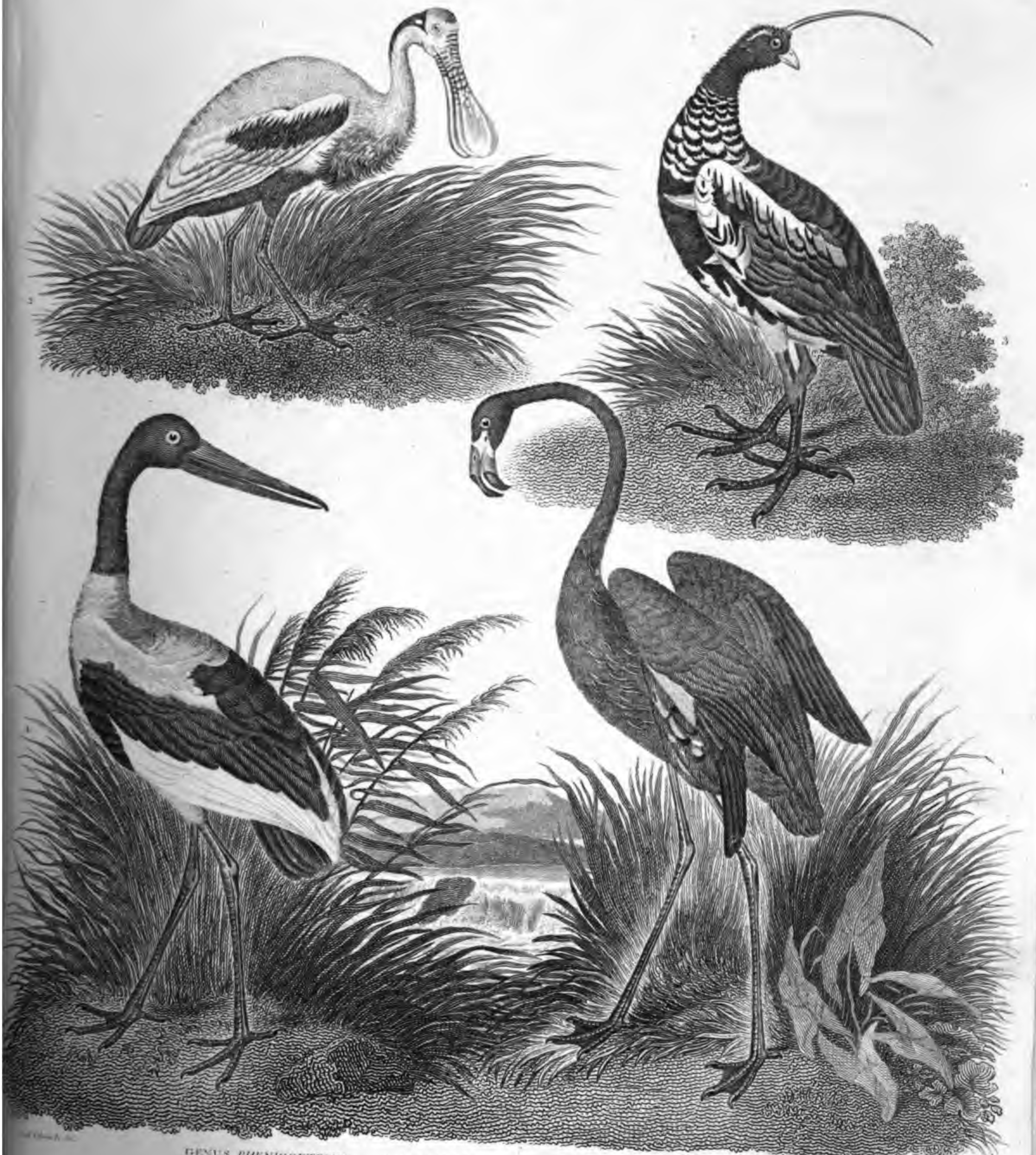
This most elegant species is two feet three inches in length; the beak is six inches in length, and marked all round with a groove, parallel to the margin; it is of a grayish white; the forehead, the space between the beak and eyes, and the throat, are naked and whitish; the plumage is of a fine rose colour, deepest on the wings; the tail coverts crimson; the legs are gray, and the claws dusky. Inhabits Jamaica, Guiana, Mexico, and other parts of the middle regions of America, feeding on fish, &c.

Linn. Syst.

ORNITHOLOGY.

Order GRALLÆ.

PLATE 43.
of Order G.



GENUS PHENICOPTERUS.
1. P. Ruber.
RED FLAMINGO.

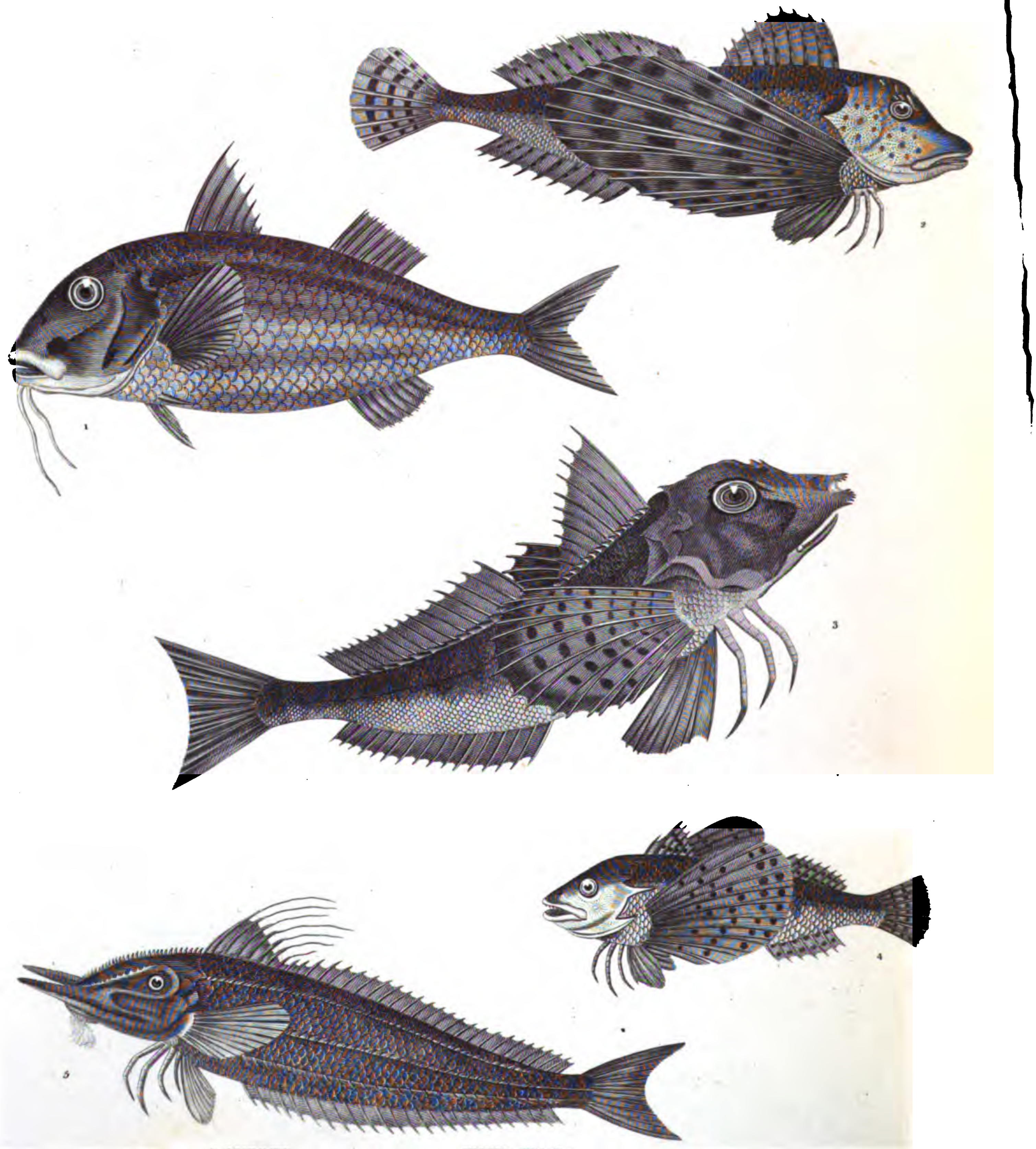
G. PLATALEA.
2. P. Ajaja.
ROSEATE SPOON BILL.

G. PALAMEDEA.
3. P. Cornuta.
HORNED SCREAMER.

G. MYCTERIA.
4. M. Novæ Hollandiæ.
NEW HOLLAND JABIRU.

ICHTHYOLOGY.

ORDER THORACICI.



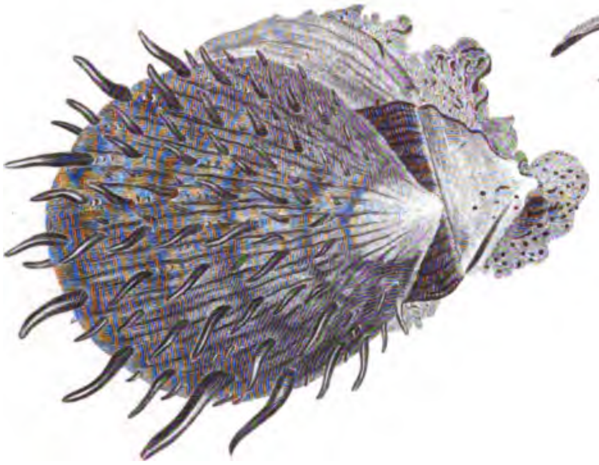
G. *MULLUS*
(Mullet)

GENUS *TRIGLA*
(Gurnard)

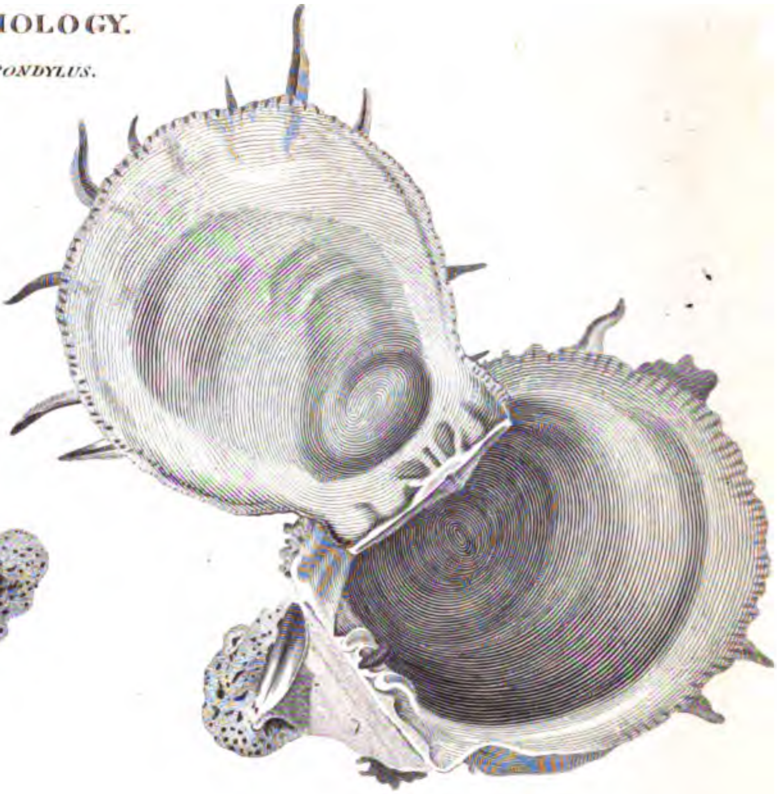
1. M. *Surmuletus* _ 2. T. *Carolina* _ 3. T. *Hirundo* _ 4. T. *Punctata* _ 5. T. *Cataphractus*

J. Cone Sc.

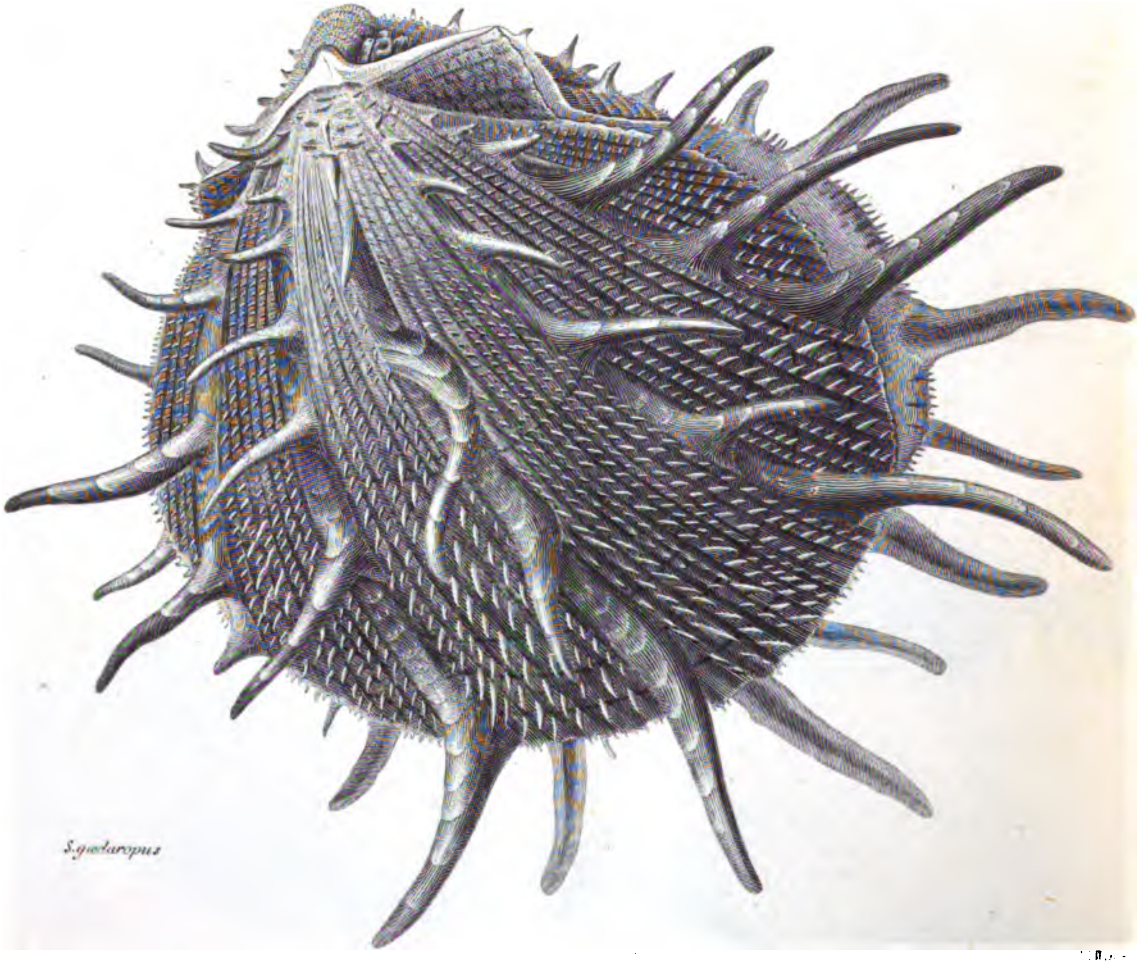
Genus SPONDYLUS.



S.gædaropus var.



S.gædaropus var.



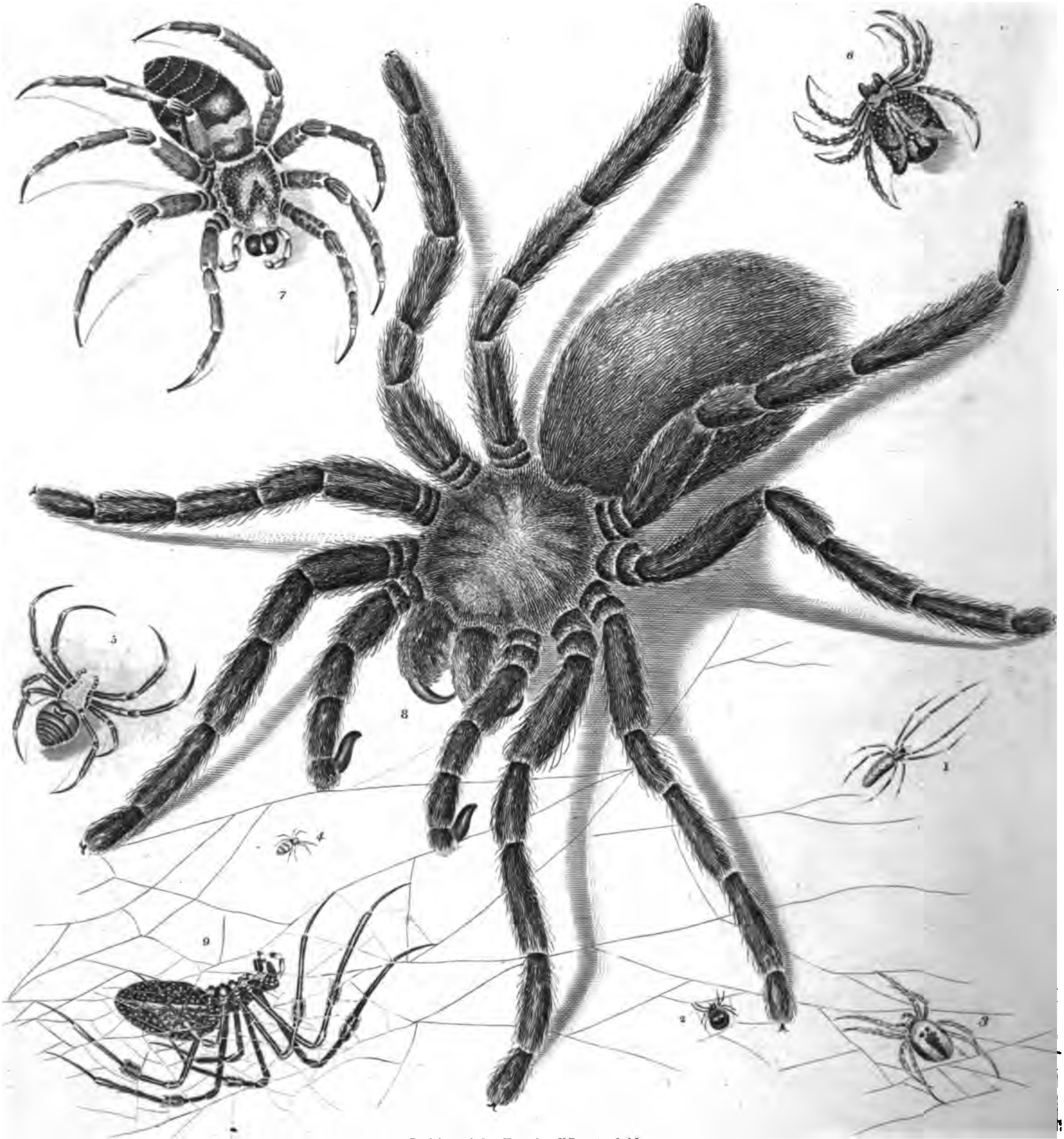
S.gædaropus

ENTOMOLOGY.

Order Aptera.

GENUS *ARANEA*.

(Spider)



Position of the Eyes in different Spiders

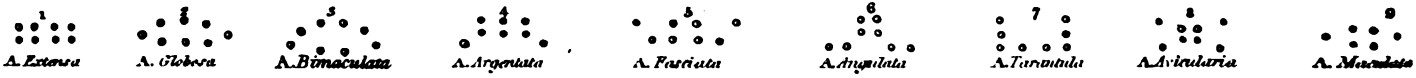


FIG. 3. *Horned Screamer. Platalea Cornuta*, LINN. and CUV.

As large as a turkey. From the crown of the head springs a slender horn of more than three inches in length, and pointed at the end. A most remarkable feature of this curious bird, consists of two strong, sharp, horny, yellow spurs, the longest more than an inch and a half. It is a rare species, and is found in Cayenne, Brazil, and other parts of South America. Their fidelity to their mates is said to be such, that when one dies the other never departs from the carcass, but dies with its companion!

FIG. 4. *New Holland Jabine. Mycteria Nova Hollandia*, LINN. and CUV.

This species measures, from the tip of the beak to the end of the claws, full six feet; the beak is a foot long. General colour of the plumage, white. These birds are occasionally seen on the muddy banks of the harbour of Port Jackson, searching for fish when the tide is out.

PLATE XLIV.—ICHTHYOLOGY.

FIG. 1. ***Mullus surmulletus***, LINN. CUV. ***Surmullet.***

The body of this fish is marked with longitudinal yellow bands; and its scales are silvery. It is common in the seas of Europe.

FIG. 2. ***Trigla carolina***, LINN. ***Prionotus carolinus***, CUV. ***Whitish Gurnard.***

This fish is speckled with red, has triple fingers, and brown pectoral fins, transversely banded with black: dorsal fins pale orange, spotted with brown; tail rounded and crossed by three or four rows of brown spots. Inhabits the coast of the United States.

FIG. 3. ***Trigla hirundo***, LINN. CUV.

This gurnard has neither spines nor furrows on the sides; the back is brownish or reddish; pectorals edged with blue. It inhabits the coast of Europe, and is sometimes two feet in length.

FIG. 4. ***Trigla punctata***, LINN. ***Prionotus punctatus***, CUV. ***Rose-red Gurnard.***

This species has blood-red specks, a broad, spinous head, and large, rounded pectoral fins, of a dusky blue colour, specked with red, and inclining to yellow towards the tips; rest of the fins and tail yellow, speckled like the body. It inhabits the American seas.

FIG. 5. ***Trigla cataphracta***, LINN. ***Peristedion cataphracta***, CUV. ***Red Gurnard.***

With double fingers, elongated and forked snout, and octagonal mailed body. The pectoral fins and tail are pale brown; the other fins pale yellow. Inhabits the Mediterranean sea, and grows to the length of twelve inches.

The class of Fishes is composed of oviparous animals, with a vertebral column and a double circulation, but their respiration is wholly effected through the medium of water. For this purpose, they have an apparatus on each side of the neck, consisting of laminæ suspended in arches, resembling a fringe attached to a cord. This arrangement constitutes the *gills*. The water swallowed by the fish escapes between the gills, and by means of the air it contains acts upon the blood that is continually coming into the gills from the heart, which only represents the right auricle and ventricle of warm-blooded animals. The blood thus changed, is poured into the arterial trunk under the spine, whence it is distributed to every part of the body, to be of course returned again by the veins.

The entire structure of Fishes is evidently adapted to swimming, as that of Birds is to flight. Suspended in a liquid of nearly their own specific gravity, there is no necessity for large wings to support them; though in many species there is, immediately under the spine, a bladder filled with air, which, by compression or dilatation, varies the gravity of the fish, and enables it to rise or descend.

The *fins* that correspond to the anterior extremities of quadrupeds, are called *pectorals;* and those which answer to the posterior ones, *ventrals*. The superior fins are called *dorsal*, the inferior *anal*, and that at the end of the tail *caudal*.

Vide M'Murtrie's Cuvier, vol. 2, p. 91, etc.

PLATE XLV.—CONCHOLOGY.

This plate gives accurate illustrations of three varieties of the beautiful shell called *Spondylus gædaropus*, an inhabitant of the Indian seas. It is a foliaceous shell, with long, sharp spines; its hinge is complex, for besides the cavity for the ligament, (as in the oyster,) there are two teeth to each valve, that enter into concavities in the opposite one. The animal has the borders of its mantle furnished with two rows of tentaculæ; before the abdomen is the vestige of a foot, formed like a broad radiated disk, and endowed with contraction and expansion. Its shell is of a brownish-red colour, often mottled with white.

The Spondyli attach themselves to all sorts of bodies, rocks, wood, other shells, &c. In India they are eaten like oysters.

PLATE XLVI.—ENTOMOLOGY.

Genus ARANEA. *Spider.*

The genus Aranea of Linnæus embraces the whole family of spiders: the mouth is furnished with two short, horny jaws; the lip is rounded at the apex; they have two feelers, incurved, jointed, very acute at the lip: they are without antennæ; have eight eyes, or, more rarely, six;—and eight feet: they spin their web by means of peculiar anal papillæ.

The position of the eyes varies greatly in different species; thus, in some they form a quadrangle on the back of the head, two looking in front, two behind, and two on each side. The disposition of them in *A. globosa* (fig. 2.) is altogether different, five of them forming a semicircle in front, and three have a linear position behind. In *A. argentata* (fig. 4.) the order is reversed, the three parallel eyes being in front, and the remaining five behind, forming a curve. In *A. extensa* (fig. 1.) they form two parallel lines across, of four eyes each. Other modifications, equally striking, are represented on the plate.

Spiders have usually five papillæ at the extremity of the abdomen, whose apertures they can enlarge or contract at pleasure: it is through these apertures that they spin a glutinous substance with which their bodies are charged. They fix the end of their thread by applying these nipples to any object, the thread elongating as the insect recedes. When the common house spider begins his web, he chooses a crevice or corner, so that he can escape from threatened danger. He then attaches one end of his thread to the wall, and passes on, dragging the thread along with him, till he arrives at the other side, where the loose end is now fastened. Thus he passes and repasses, until a sufficient number of parallel threads have been formed. After this, the spider begins again, and crosses these by other parallel threads, until a net is completed for the capture of flies and other small insects.

But besides this large web, the spider generally weaves a small one for himself, communicating with the former by a sort of bridge, so that intelligence is speedily conveyed to the occupant, whenever anything even touches the outer net.

There are other modes of weaving peculiar to different species of spiders, some of which are worth mentioning. The *Aranea venatoria* forms a large cylindrical web under ground, with a lid connected by a kind of hinge, which can be opened or shut at pleasure: the inhabitant watches for his prey at the entrance of the den, and, when alarmed, retreats within and secures the door. This species inhabits South America.

A European species, *A. labyrinthica*, spins a horizontal web on the ground, with a cylindrical cavity below the surface, in which he watches for his prey. *A. marmorea* spins on the ground, much in the same manner. Some live in trees, and spin long, perpendicular webs, as *A. augulata;* (fig. 6.) and one species, *A. calycina*, secretes itself in the calyx of a flower, after the corolla has fallen, and fastens on flies and other insects, as they come to extract its juices.

The matter of which a spider's web is formed, as before observed, is a viscid juice secreted in the body of the animal, and drawn out through the abdominal papillæ. The observations of Reaumur on this subject, are very curious; for he informs us that a papilla has numerous apertures, and that there are enough in the compass of a pin's head to yield an amazing number of distinct threads, not less than a thousand proceeding from each papilla!

The mode by which spiders shoot their lines is thus summed up by Mr. Rennie, author of the History of Insects.

" So far as we have determined, all the various species of spiders, how different soever the form of their webs may be, proceed in the circumstance of shooting their lines precisely alike; but those which we have found the most manageable in experimenting, are the small gossamer spider (*A. obtectrix*, Bechstein), known by its shining blackish-brown body and reddish-brown semi-transparent legs; but particularly the long-bodied spider (*Tetragnatha extensa*, Latr.), which varies in colour from green to brownish or gray—but has always a black line along the belly, with a silvery white or yellowish one on each side. The latter is chiefly recommended by being a very industrious and persevering spinner, while its movements are easily seen, from the long cylindrical form of its body and the length of its legs.

We placed the above two species with five or six others, including the garden, the domestic, and the labyrinthic spiders, in empty wine-glasses set in tea-saucers filled with water to prevent their escape. When they discovered, by repeated descents from the brims of the glasses that they were thus surrounded by a wet ditch, they all set themselves to the task of throwing their silken bridges across. For this purpose they first endeavoured to ascertain in what direction the wind blew, or rather (as the experiment was made in our study) which way any current of air set,—by elevating their arms as we have seen sailors do in a dead calm. But, as it may prove more interesting to keep to one individual, we shall first watch the proceedings of the gossamer spider.

Finding no current of air on any quarter of the brim of the glass, it seemed to give up all hopes of constructing its bridge of escape, and placed itself in the attitude of repose; but no sooner did we produce a stream of air, by blowing gently towards its position, than, fixing a thread to the glass, and laying hold of it with one of its feet, by way of security, it placed its body in a vertical position, with its spinnerets extended outwards; and immediately we had the pleasure of seeing a thread streaming out from them several feet in length, on which the little aëronaut sprung up into the air. We were convinced, from what we thus observed, that it was the double or bend of the thread which was blown into the air; and we assigned as a reason for her previously attaching and drawing out a thread from the glass, the wish to give the wind a *point d'appui*—something upon which it might have a *purchase*, as a mechanic would say of a lever. The bend of the thread, then, on this view of the matter, would be carried out by the wind,—would form the point of impulsion,—and, of course, the escape bridge would be an ordinary line doubled.

Such was our conclusion, which was strongly corroborated by what we subsequently found said by M. Latreille—than whom no higher authority could be given. 'When the animal,' says he, 'desires to cross a brook, she fixes to a tree or some other object, one of the ends of her first threads, in order that the wind or a current of air may carry the other end beyond the obstacle;' and as one end is always attached to the spinnerets, he must mean that the double of the thread flies off.

In order to ascertain the fact, and put an end to all doubts, we watched with great care and minuteness, the proceedings of the long-bodied spider above mentioned, by producing a stream of air in the same manner, as it perambulated the brim of the glass. It immediately, as the other had done, attached a thread and raised its body perpendicularly, like a tumbler standing on his hands with his head downwards; but we looked in vain for this thread bending, as we had at first supposed, and going off double. Instead of this it remained tight, while another thread, or what appeared to be so, streamed off from the spinners, sometimes in a line, and sometimes at a considerable angle, with the first, according to the current of the air,—the first thread extended from the glass to the spinnerets, remaining all the while tight drawn in a right line. It further appeared to us, that the first thread proceeded from the pair of spinnerets nearest the head, while the floating thread came from the outer pair,—though it is possible in such minute objects we may have been deceived. That the first was continuous with the second, without any perceptible joining, we ascertained in numerous instances, by catching the floating line and pulling it tight, in which case the spider glides along without attaching another line to the glass; but if she have to coil up the floating line to tighten it, as usually happens, she gathers it into a packet and glues the two ends tight together. Her body, while the floating line streamed out, remained quite motionless, but we distinctly saw the spinnerets not only projected, as is always done when a spider spins, but moved in the same way as an infant moves its lips when sucking. We cannot doubt, therefore, that this motion is intended to emit (if *eject* or *project* be deemed too strong words) the liquid material of the thread; at the same time, we are quite certain that it cannot throw out a single inch of thread without the aid of a current of air. A long-bodied spider will thus throw out in succession as many threads as we please, by simply blowing towards it; but not one where there is no current, as under a bell-glass, where it may be kept till it die, without being able to construct a bridge over water of an inch long. We never observed more than one floating thread produced at the same time; though other observers mention several.

The probable commencement, we think, of the floating line, is by the emission of little globules of the glutinous material to the points of the spinnerules—perhaps it may be dropped from them, if not ejected, and the globules being carried off by the current of air, drawn out into a thread. But we give this as only a conjecture, for we could not bring a glass of sufficient power to bear upon the spinnerules at the commencement of the floating line.

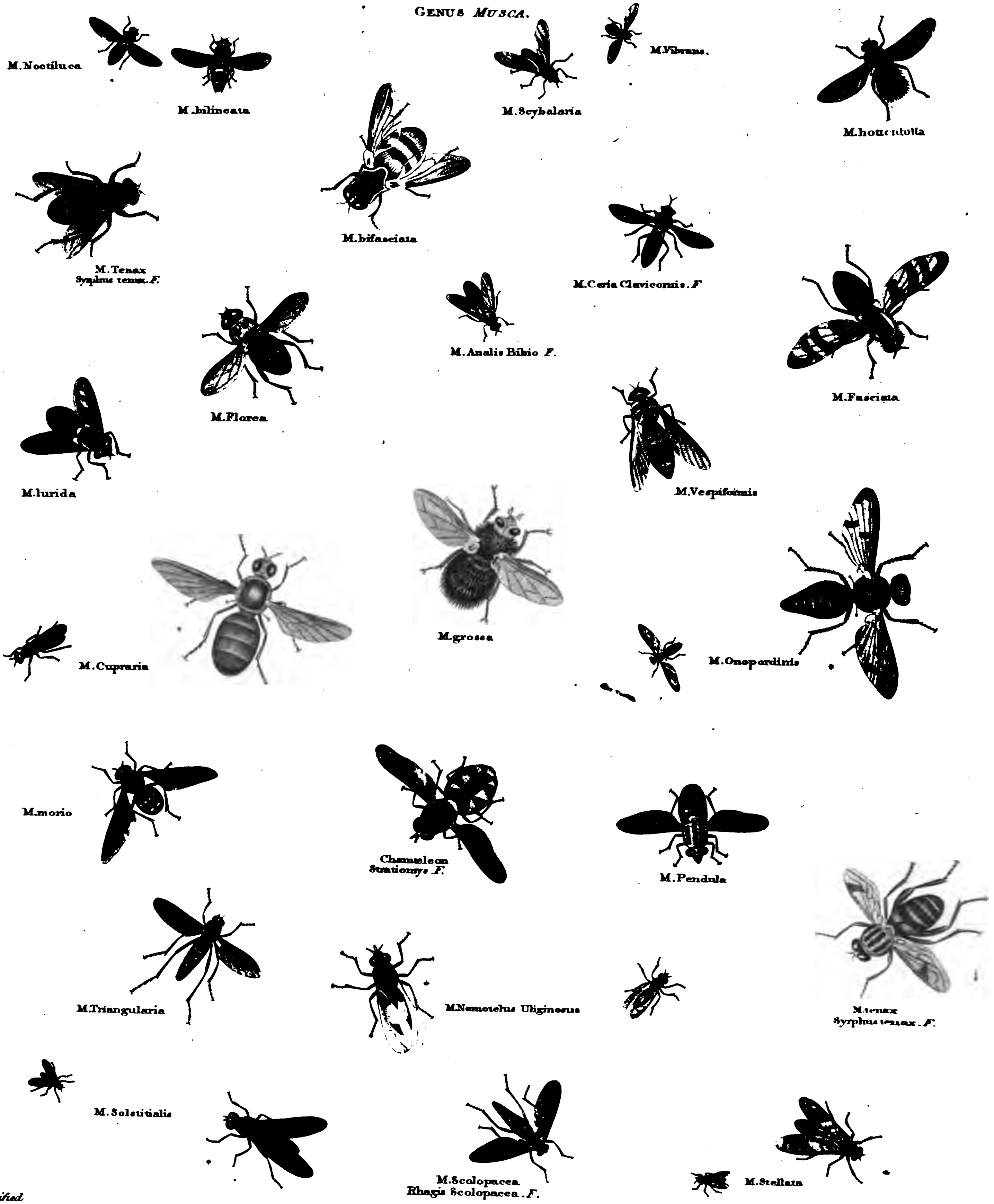
In subsequent experiments we found, that it was not indispensable for the spider to rest upon a solid body when producing a line, as she can do so while she is suspended in the air by another line. When the current of air also is strong, she will sometimes commit herself to it by swinging from the end of the line. We have even remarked this when there was scarcely a breath of air.

We tried another experiment. We pressed pretty firmly upon the base of the spinnerets, so as not to injure the spider, blowing obliquely over them; but no floating line appeared. We then touched them with a pencil and drew out several lines an inch or two in length, upon which we blew in order to extend them, but in this also we were unsuccessful, as they did not lengthen more than a quarter of an inch. We next traced out the reservoirs of a garden-spider (*Epeira diadema*),

ENTOMOLOGY

Order Diptera.

GENUS *MUSCA*.



* *Magnified*

♀ *Female*

F. Fabricius

C.G.Childs Sc.

and immediately taking a drop of the matter from one of them on the point of a fine needle, we directed upon it a strong current of air, and succeeded in blowing out a thick yellow line as we might have done with gum-water, of about an inch and a half long.

When we observed our long-bodied spider eager to throw a line by raising up its body, we brought within three inches of its spinnerets an excited stick of sealing-wax, of which it took no notice, nor did any thread extend to it, not even when brought almost to touch the spinnerets. We had the same want of success with an excited glass rod; and indeed we had not anticipated any other result, as we have never observed that these either attract or repel the floating threads, nor have we ever seen the end of a floating thread separated into its component threadlets and diverging like a brush."

Some experiments have been made to manufacture the thread of spiders into a kind of silk. Sir G. Staunton, when speaking of the forests in Java, says, that "in some open spots were found webs of spiders woven with threads of so strong a texture as not easily to be divided without a cutting instrument: they seemed to render feasible the idea of him, who, in the southern provinces of Europe, proposed a manufactory of spiders' threads, which was so ridiculous to the eyes of those who have only viewed the flimsy webs such insects spin in England."

Spiders, in every stage of their existence, prey with the most savage ferocity on all other insects, and even upon one another. Their weapon is a pair of sharp crooked claws or forceps, placed in the fore part of the head.

They cast their skins once a year, and this they perform by suspending themselves in some corner, and creeping out of it.

The subject of spiders is a prolific one to the naturalist; we have room at present only for the following from Kirby and Spence:—"The Rev. R. Shepherd has often noticed in the fens of Norfolk, a very large spider which actually forms a *raft* for the purpose of obtaining its prey with more facility. Keeping its station upon a ball of weeds about three inches in diameter, probably held together by slight silken cords, it is wafted along the surface of the water upon this floating island, which it quits the moment it sees a drowning insect. The booty thus seized it devours at leisure upon its raft, under which it retires when alarmed by any danger."

EXPLANATION OF PLATE 46.

Fig. 1. *Aranea extensa*, Linn. *Tetragnatha extensa*, Lat.
Fig. 2. *Aranea globosa*, Linn. *Thomisus globosus*, Lat.
Fig. 3. *Aranea bimaculata*, Linn.
Fig. 4. *Aranea argentata*, Linn.
Fig. 5. *Aranea fasciata*, Linn. *Epeira fasciata*, Lat.
Fig. 6. *Aranea augulata*, Linn.
Fig. 7. *Aranea tarentula*, Linn. *Lycosa tarentula*, Lat.
Fig. 8. *Aranea avicularia*, Linn. *Mygale avicularia*, Lat.
Fig. 9. *Aranea maculata*, Linn.

The gigantic Aranea avicularia, or Bird-catching Spider, is too remarkable an insect to be passed over in silence. It is not uncommon in many parts of the East Indies, and South America, where it resides among trees; frequently seizing on small birds, which it destroys by wounding with its fangs, and afterwards sucking their blood. The orifice near the tip of the fangs in spiders, through which the poisonous fluid is evacuated, is in this species so visible, that it may be perceived without the assistance of a glass.

The tarentula spider, of which so many idle stories have been detailed, and which are believed to this day, by the vulgar, is a native of the warmer parts of Europe, and is found in dry and sunny plains. It is the largest of all the European spiders. In the present illuminated state of science, it may be sufficient to observe that the extraordinary symptoms supposed to ensue from the bite of this insect, as well as their supposed cure by the power of music alone, are entirely fabulous, and the idea is now exploded among all rational philosophers.

PLATE XLVII.—ENTOMOLOGY.

Musca is the generic name of the Fly; the species of this genus belong to the order *Diptera*, have a mouth with a short exserted fleshy proboscis, and two equal lips: sucker furnished with bristles; two feelers, but very short; sometimes they are wanting: antennæ generally short.

Latrielle and others have recently subdivided this genus into many others, the most remarkable of which are figured on the annexed plate.

During their larva existence, flies go through a greater variety of metamorphoses than the silk-worm: in their progress from the vermicular to the chrysalis state, they pass through a change unexperienced by other insects. From the shortness of their lives, all these vicissitudes rapidly succeed each other; but this circumstance does not prevent many species from constructing a cocoon for their last metamorphosis. The greater part of these cocoons are of a silky texture: many species, again, derive this covering from their own skin, which becomes an incrusted covering to protect them during their dormant state.

When the different members have acquired sufficient firmness, the fly is ready to burst from its shell in its winged form, and of its mature size.

The food of flies is as various as their different kinds; some being supported wholly by vegetable substances, while others are carnivorous; and among the latter are some that only devour flesh in a state of putrefaction.

The following histories of several species will serve to give an idea of the metamorphoses to which we have just alluded.

The *M. Chamæleon*, (see plate,) is a large black fly, with a broad, flattish abdomen, having the sides of each segment yellow, forming so many abrupt semi-bands across the part. It proceeds from an aquatic larva of great size, measuring two inches and a half in length, of a flattened shape, and brown colour: this larva is deposited in water during the summer months, and passes into the chrysalis state without casting its skin, which dries over it, so as to preserve the former appearance of the animal in a more contracted state.

The *M. tenax* of Europe, (see plate,) proceeds from a long-tailed brown larva, about three-fourths of an inch in length, exclusive of the tail, which is extensible, and consists of a double tube. Like the preceding species, it is deposited in stagnant water. The name of Linnæus is quoted for a circumstance connected with this larva which seems almost too marvellous to be credited: viz. that it being a frequent inhabitant of the pulp used in the operation of paper-making, it is often exposed to the operation of the wooden mallets used in the process, as well as squeezed in the strongest presses, and yet survives, uninjured, these seemingly destructive operations.—The above larva changes to a chrysalis in August, the skin contracting and drying round it, and the tail continuing in a shrivelled state. After this remains about a fortnight, it gives birth to the complete insect, which has so much the appearance of a Drone as often to be mistaken for one.

The *M. carnaria*, the common blow-fly, deposits its eggs in animal flesh; they hatch in the space of a few hours, and are full grown in eight or ten days. The skin of this insect forms its chrysalis, in which it remains about two days, and then emerges a perfect fly.

Encyclop.—Shaw's Zool. Vol. VI.

The following synonyma of some of the species of Musca figured on the plate, may serve to assist the learner in his inquiries.

Musca vibrans is the ***Ortalis vibrans*** of Latrielle.
M. hottentotta is the ***Anthrax hottentotta*** "
M. tenax is the ***Helophilus tenax*** "
M. fasciata is the ***Nemestrina fasciata*** "
M. cupraria is the ***Sargus cuprarius*** "
M. grossa is the ***Echinomya grossa*** "
M. morio is the ***Anthrax morio*** "
M. chamæleon is the *Stratiomys chamæleon* "
M. pendula is the ***Helophilus pendulus*** "
M. uliginosus is the ***Nemotelus uliginosus*** "
M. scolopacea is the ***Leptis scolopacea*** "

PLATE XLVIII.—AMPHIBIA.

Fig. 1. ***White Amphisbaena. Amphisbaena alba***, Linn. and Cuv.

The remarkable genus Amphisbaena is distinguished by the exterior surface of the skin being marked into well-defined numerous circles or rings, surrounding the body, and divided in a longitudinal direction, by still more numerous straight lines, and forming square scales. Only two species of this genus have been discovered. The present is white—head short, and eyes small; the snout obtuse; teeth short, strong, and obtuse; the tongue is large; has about 223 circles on the body, and 16 on the tail. It is a native of South America, and harmless.

Fig. 2. ***Fuliginous Amphisbaena. A. fuliginosa***, Linn. and Cuv.

This species is distinguished from the former by its colours, being purplish-brown, variegated with patches of yellowish-white. The skin is very strong, and the scales distinct, or strongly marked. It varies sometimes in its colour. Inhabits South America, and likewise innoxuous.

Fig. 3. ***Eel-shaped Cæcilia. Cæcilia tentacula***, Linn. and Cuv.

The length of this species is about a foot, and it resembles an eel; colour a livid brown; taper-formed head, with small eyes; each jaw has a row of small sharp teeth, and a beard projects beneath the nostrils: across the sides of the body run many semi-annular wrinkles, amounting to 135 in number. It is a native of South America, and harmless.

PLATE XLIX.

ZOOPHYTES, Linn. RADIATA, Cuv.

Fig. 1. ***Spongia protifera***, Linn. Cuv.
Fig. 2. ***Spongia coronata***, Linn. Cuv.
Fig. 3. ***Spongia palmata***, Linn. Cuv.
Fig. 4. ***Spongia tubulosa***, Linn. Cuv.

The Sponges belong to the class Polypi of Cuvier, being the fourth of his division of ***Radiated Animals***. Sponges are marine fibrous bodies, whose only sensible portion appears to be a gelatinous substance, which dries without leaving scarcely a trace; nor have any polypi, or other moving parts, yet been detected in it: yet living sponges are said to exhibit a sort of tremulousness, or contraction, when touched. They assume innumerable shapes, each according to its species, and resemble shrubs, horns, vases, tubes, globes, fans, &c.

Every one knows the common sponge of the shops, (spongia officinalis) which is found in large brown masses, formed of extremely fine, flexible, and elastic fibres, perforated with numerous pores, and little irregular canals, all communicating freely with each other. ***M'Murtrie's Cuv.***

Fig. 5. ***Alcyonium gorgonoides***, Linn. Cuv.

The animals of this remote link of living creatures, are placed by Cuvier next to the sponges, to which they are closely allied.

BOTANY.

In the former numbers of this work we gave illustrations of the twenty-four Linnæan Classes of Plants, according to the number of the ***stamina:*** we now proceed to exhibit the Linnæan Orders, as established upon the number of ***pistils***.

PLATES L. AND LI.

Fig. 1. ***Monogynia***, one style or stigma, (with five stamens) as in an extensive series of plants, among which are ***Heliotropium***, ***Anchusa***, ***Borago***, &c.

Fig. 2. ***Digynia***, two styles, (with ten stamens) as in ***Chrysosplenium***, ***Metella***, ***Scleronthus***.

Fig. 3. ***Trigynia***, three styles, (with ten stamens) as in ***Silene***, ***Stellaria***, &c.

Fig. 4. ***Tetragynia***, four styles, with four stamens, as in ***Ruppia***, ***Sagina***, &c.; with five stamens, as ***Parnassia;*** with six stamens, as in ***Petiveria***.

Fig. 5. ***Pentagynia***, five styles, (with ten stamens) as in ***Oxalis***, ***Suriana***, ***Lychnis***, &c.

Fig. 6. ***Hexagynia***, six styles, as in ***Butomus***.

Fig. 7. ***Heptagynia***, seven styles, (with seven stamens) as in ***Septas***.

Fig. 8. ***Decagynia***, ten styles, (with ten stamens) as in ***Neurada***, and ***Phytolacca***.

Fig. 9. ***Dodecagynia***, twelve styles, (with twelve stamens) as in ***Sempervivum***.

Fig. 10. ***Polygamia***, many styles, as in the 1st, 2d, 3d, and 4th orders of the class ***Syngenesia***.

Fig. 11. ***Gymnospermia***, naked seeds, as in ***Ajuga***, ***Teucrium***, ***Satureja***, &c.

Fig. 12. ***Angiospermia***, seeds inclosed in a pericarpium, or seed-vessel, as in ***Anterrhinum***, ***Cybaria***, &c. &c.

Fig. 13. ***Siliculosa***, pericarpium a silicula, as in ***Thalaspi***, ***Draba***, &c.

Fig. 14. ***Siliquosa***, pericarpium a siliqua, as in ***Raphanus***, ***Sinapis***, ***Brassica***, &c.

Fig. 15. ***Polygamia æqualis***, flowers compound, all the florets hermaphrodite, as in ***Leontodon***, ***Hieracium***, &c.

Fig. 16. ***Polygamia superflua***, florets of the disk, hermaphrodite; those of the radius, female; as in ***Bellis***, (Garden daisy) ***Tussilago***, &c.

Fig. 17. ***Polygamia necessaria***, flowers or florets of the disk, male; of the radius, female; as in ***Calendula***, ***Chrysogonum***.

Fig. 18. ***Polygamia frustranea***, florets of the disk, hermaphrodite; those of the radius, neuter; as in ***Centaurea***, ***Sclerocarpus***, &c.

Fig. 19. ***Polygamia segregata***, many partial cups contained in the common calyx, which separate and surround the floscula, as in ***Echinops***, ***Sphæranthus***, &c.

Fig. 20. ***Trioecia***, having the parts of fructification on three different plants, as in ***Ficus***, and ***Ceratonia***.

Fig. 21. ***Felices***, fructification dorsiferous, (on the back of the leaf,) as in ***Asplenium***, ***Adianthum***, ***Trichomanes***, &c.

Fig. 22. ***Musci***, anthers without filaments female; flowers distinct, and without pistilla; seeds naked, without cotyledons or tunic. With or without a veil, (*calyptra*) as in ***Bryum***, ***Hypnum***, &c.

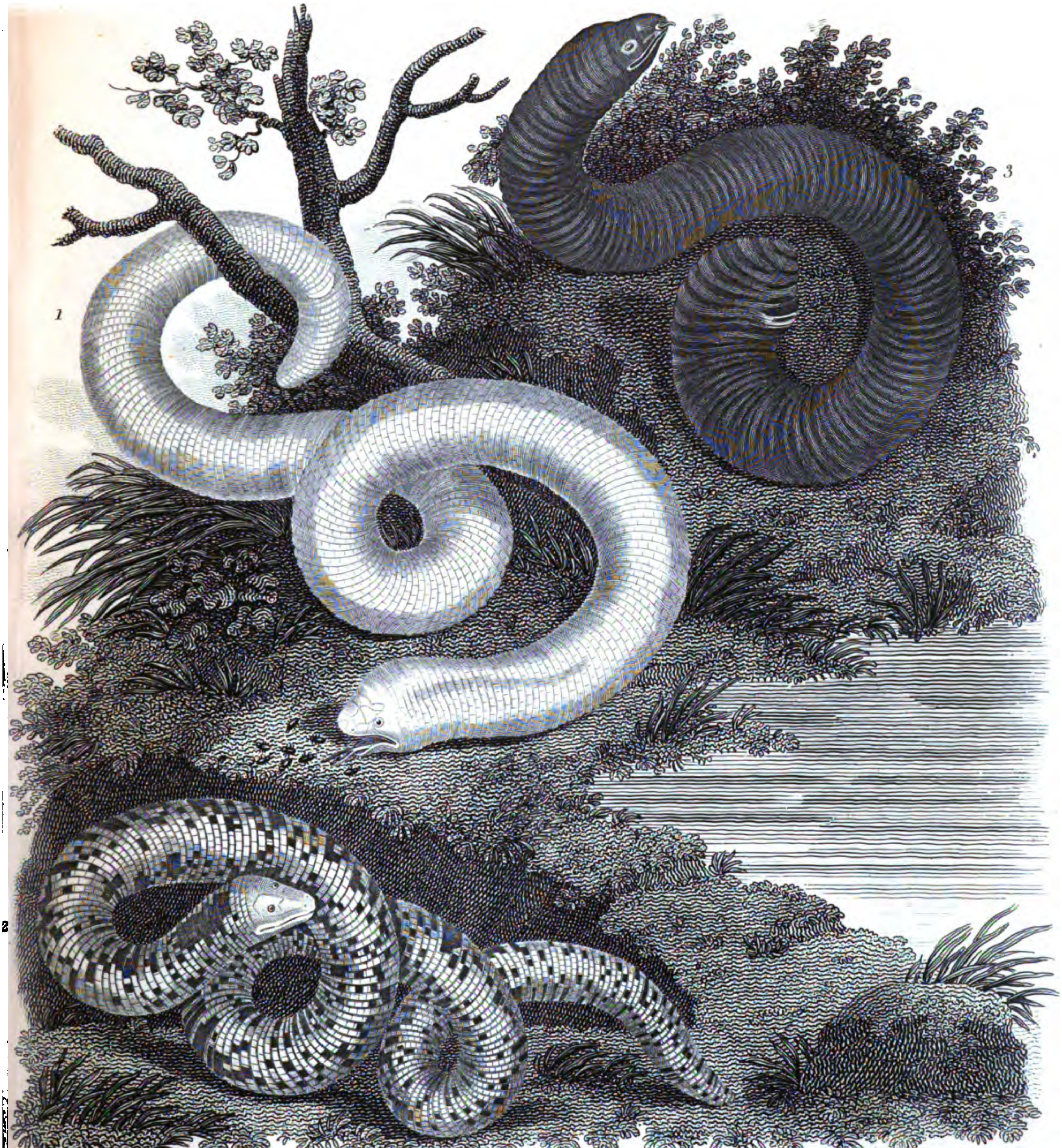
Fig. 23. ***Herpaticæ***, herbage frondose, in general, the fructification originating from what is both stem and leaf, as in ***Marchantia***, ***Jungermania***, &c.

Fig. 24. ***Algæ***, root, stem, and leaf in one, as ***Fucus***, ***Ulva***, ***Lichen***, &c.

Fig. 25. ***Fungi***—mushrooms, as ***Agaricus***, ***Boletus***, &c.

AMPHIBIA.

GENUS *AMPHISBÆNA*. GEN. *CÆCILIA*.

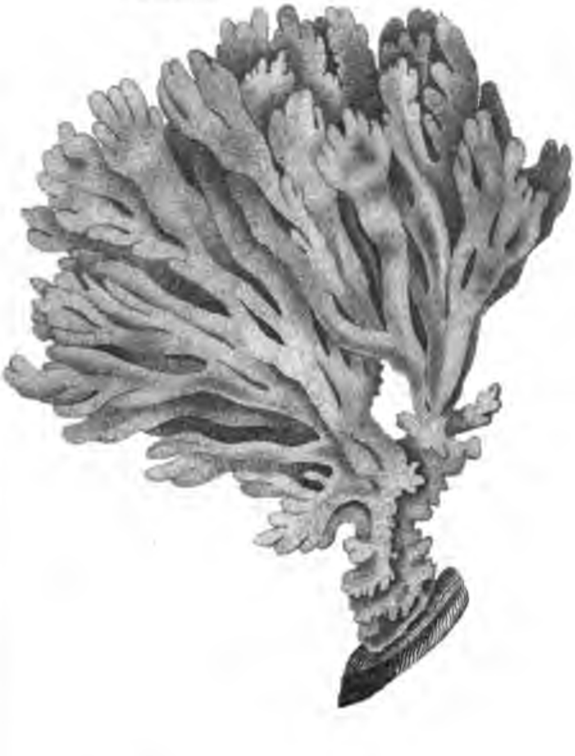


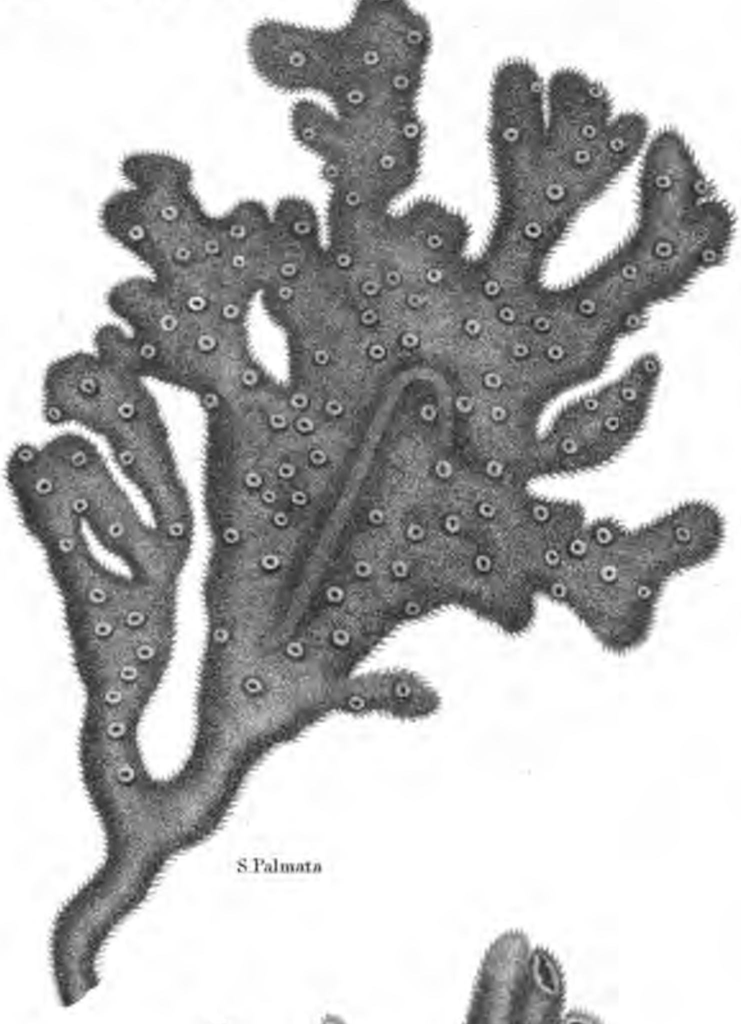
1. A. *alba*. 2. A. *fuliginosa*. 3. C. *tentacula*.
WHITE A. *FULIGINOUS A.* *EEL SHAPED C.*

ZOOPHYTES.

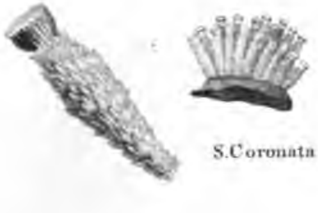
GENUS *ALCYONIUM* — GENUS *SPONGIA*

S.Protifera

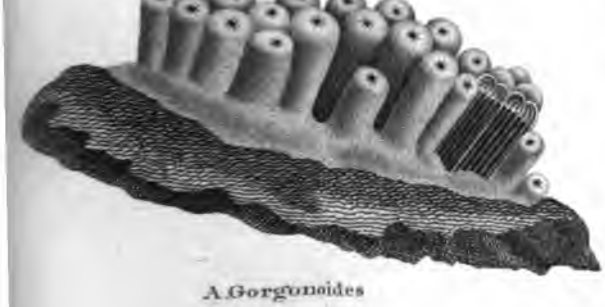




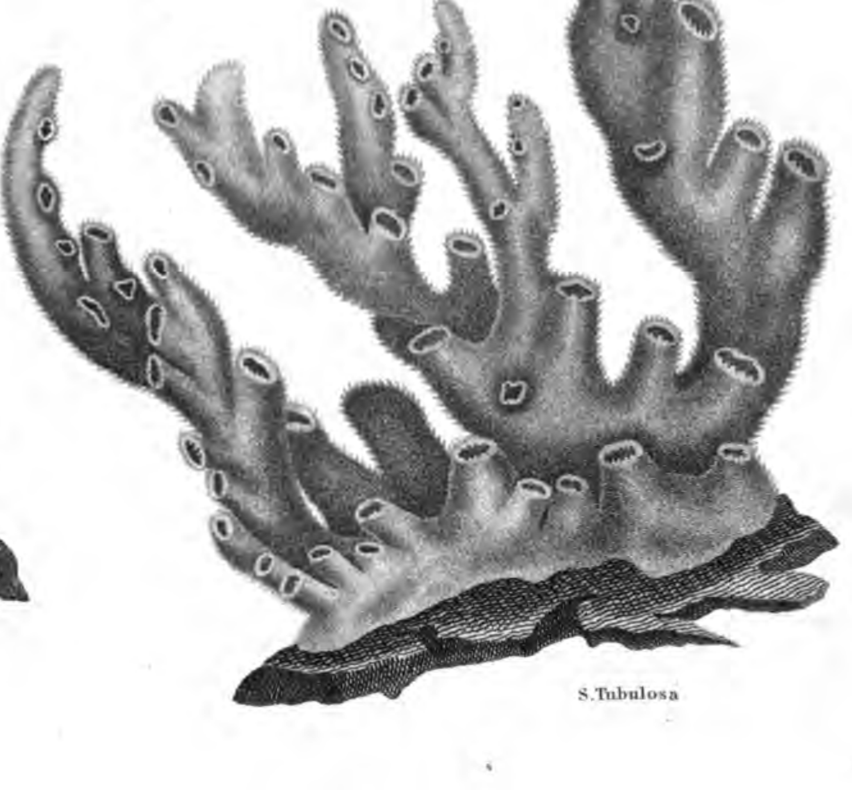
S.Palmata



S.Coronata



A.Gorgonoides



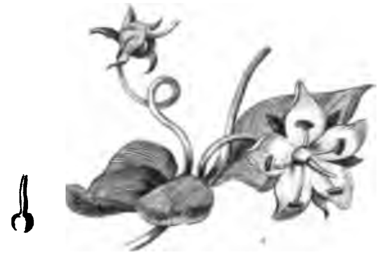
S.Tubulosa

Linn. Syst.

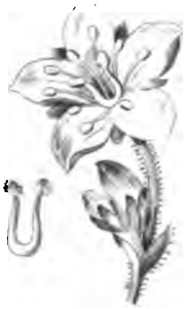
BOTANY.

PLATE 50.

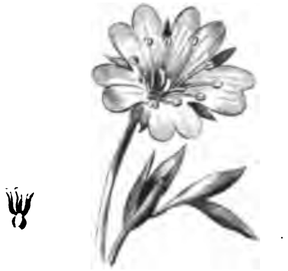
Orders.



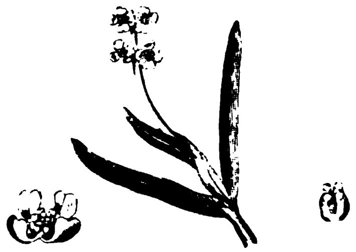
MONOGYNIA



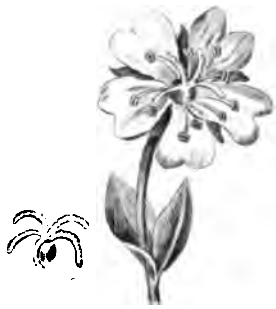
DIGYNIA



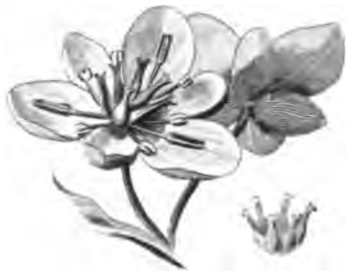
TRIGYNIA



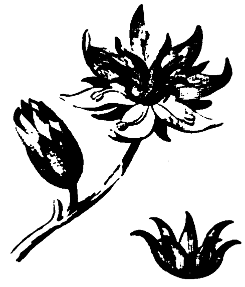
TETRAGYNIA



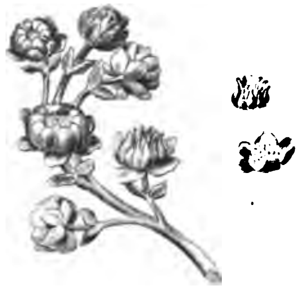
PENTAGYNIA



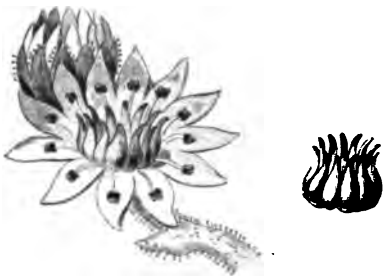
HEXAGYNIA



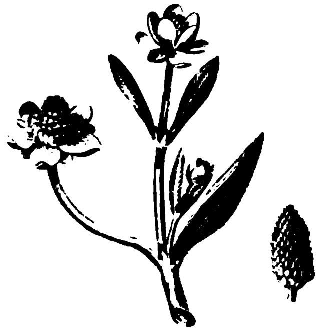
HEPTAGYNIA



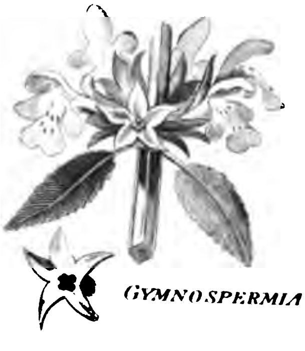
DECAGYNIA



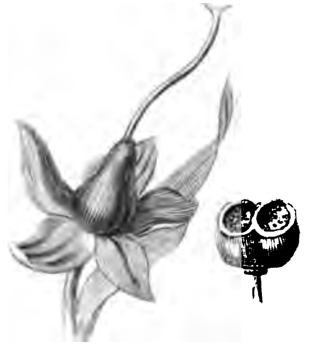
DODECAGYNIA



POLYGAMIA



GYMNOSPERMIA



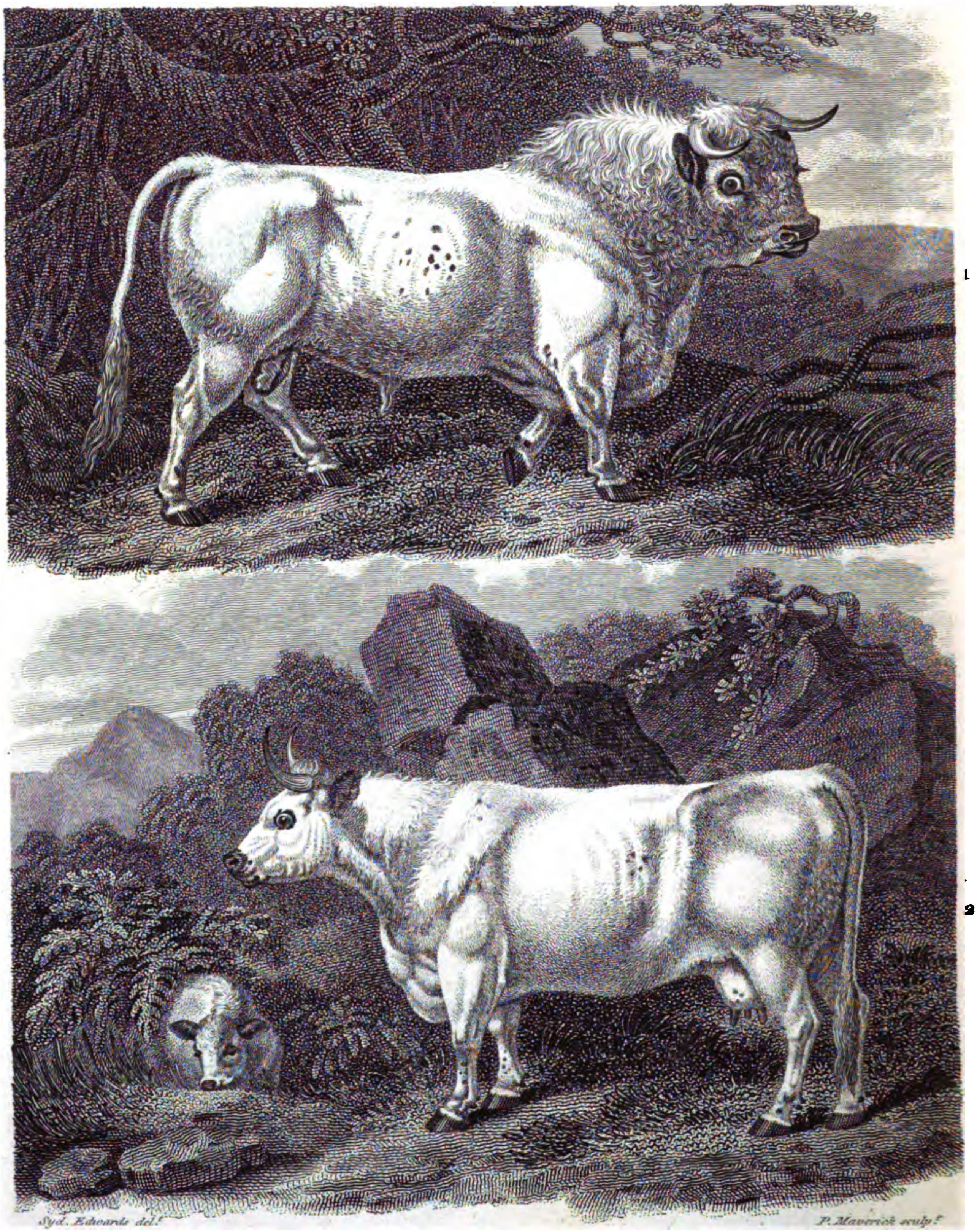
ANGIOSPERMIA

W. Hampson, fc.

QUADRUPEDS.

PLATE 7

BOS TAURUS. WILD OX OF SCOTLAND.



Syd. Edwards del.ᵗ *P. Maverick sculp.ᵗ*

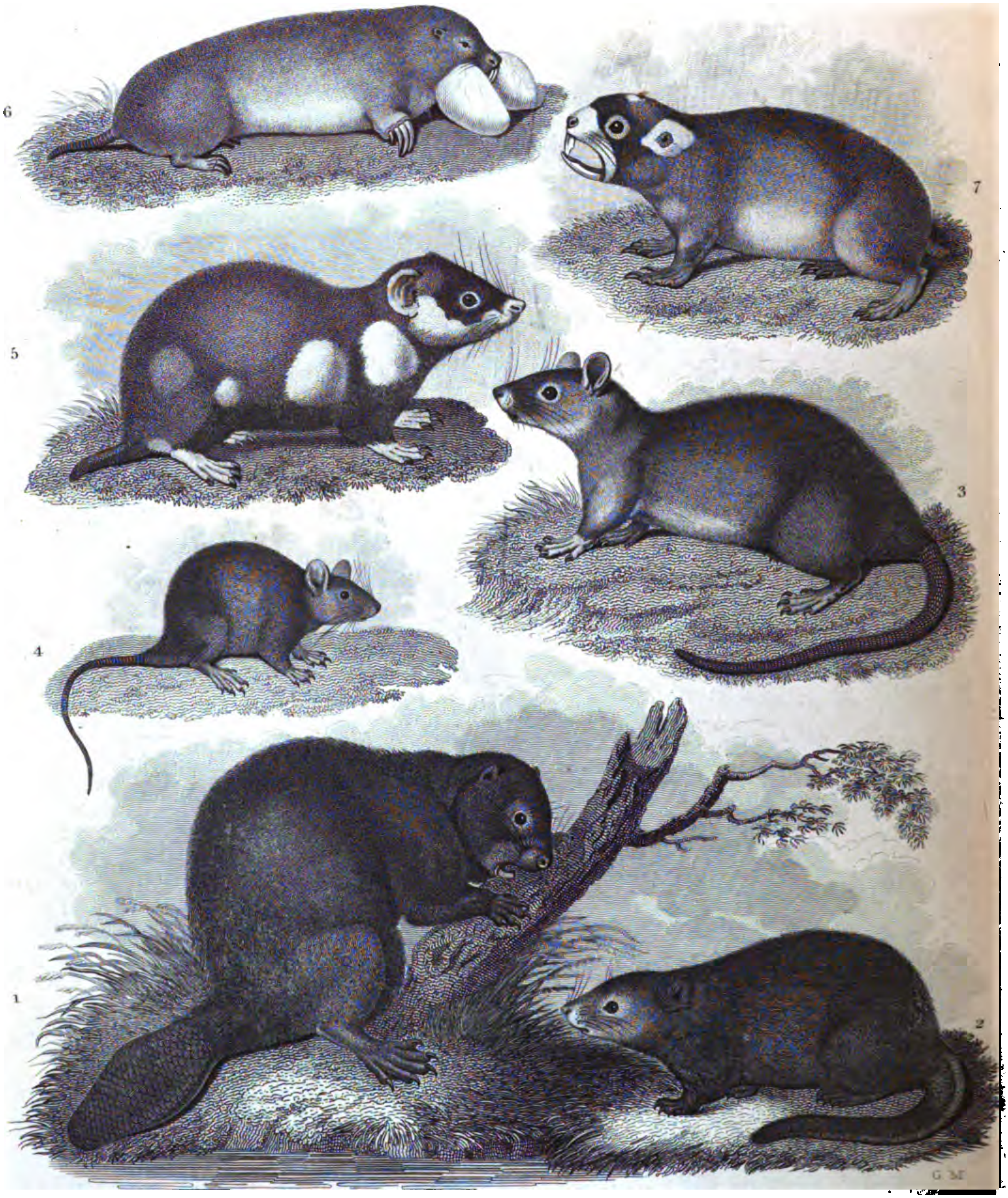
1. The Bull. 2 The Cow and Calf.

Linn. Syst.

QUADRUPEDS.

PLATE 71.

CLASS. MAMMALIA. ORDER GLIRES. GENUS CASTOR BEAVER. GENUS MUS. RAT.



1. C. Fiber. Beaver. 2. M. Zibethicus. Musk R. 3. M. Decumanus. Norway R.
4. M. Musculus. Common Mouse. 5. M. Cricetus. German Hamster R.
6. M. Bursarius. Canada R. 7. M. Capensis. Cape Mole R.

PLATE LXXI.—QUADRUPEDS.

MAMMALIA. Order GLIRES.

FIG. 1. *Beaver. Castor Fiber*, LINN. and CUV.

After rejecting the exaggerated facts, (says Dr. Godman,) as well as the numerous fictions relative to this animal, ample scope will still remain for the exercise of our admiration; for although the beaver is in no respect exclusively wonderful, yet its character and habits are such as to render it highly interesting. We shall therefore give a plain, unvarnished statement of facts obtained from the most authentic sources.

The general aspect of the beaver, at first view, would remind one of a very large rat, and seen at a little distance it might be readily mistaken for the common musk-rat.

It is only in a state of nature that the beaver displays any of those singular modes of acting which have so long rendered the species celebrated: these may be summed up in a statement of the manner in which they secure a sufficient depth of water to prevent it from being frozen to the bottom, and their mode of constructing the huts in which they pass the winter.

They are not particular in the site they select for the establishment of their dwellings, but if in a lake or pond where a dam is not required, they are careful to build where the water is sufficiently deep. In standing waters, however, they have not the advantage afforded by a current for the transportation of their supplies of wood, which, when they build on a running stream, is always cut higher up than the place of their residence, and floated down.

The materials used for the construction of their dams are the trunks and branches of small birch, mulberry, willow, poplar, &c. They begin to cut down their timber for building early in the summer, but their edifices are not commenced until about the middle or latter part of August, and are not completed until the beginning of the cold season. The strength of their teeth and their perseverance in this work, may be fairly estimated by the size of the trees they cut down. Dr. Best informed us that he has seen a mulberry tree, eight inches in diameter, which had been gnawed down by the beaver.

The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swiftly flowing, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees they intermingle mud and stones, to give greater security, and when dams have been long undisturbed and frequently repaired, they acquire great solidity, and their power of resisting the pressure of water and ice is greatly increased by the willow, birch, &c. occasionally taking root, and eventually growing up into something of a regular hedge. The materials used in constructing the dams are secured solely by the resting of the branches, &c. against the bottom, and the subsequent accumulation of mud and stones, by the force of the stream or by the industry of the beavers. In various parts of the western country, where beaver are at present entirely unknown, except by tradition, the dams constructed by their labours are still standing securely, and in many instances serve instead of bridges to the streams they obstruct. There are few states in the Union in which some remembrance of this animal is not preserved by such names as *Beaver-Dam, Beaver-Lake, Beaver-Falls*, &c.

The dwellings of the beaver are formed of the same materials as their dams, and are very rude, though strong, and adapted in size to the number of their inhabitants. These are seldom more than four old and six or eight young ones. Double that number have been occasionally found in one of the lodges, though this is by no means a very common occurrence.

When building their houses, they place most of the wood crosswise and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches which project inward are cut off with their teeth and thrown among the rest. The houses are by no means built of sticks first and then plastered, but all the materials, sticks, mud, and stones, if the latter can be procured, are mixed up together, and this composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond near the door of the hut. Mud and stones the beaver always carries by holding them between his fore paws and throat.

Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used by them in building, it is an accidental circumstance, owing to the nature of the spot whence the latter was taken. As soon as any part of the material is placed where it is intended to remain, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them upon the surface of the water when they are in the act of diving.

The outside of the hut is covered or plastered with mud late in the autumn, and after frost has begun to appear. By freezing it soon becomes almost as hard as stone, effectually excluding their great enemy, the wolverene, during the winter. Their habit of walking over the work frequently during its progress, has led to the absurd idea of their using the tail as a trowel. The habit of flapping with the tail is retained by them in a state of captivity, and, unless it be in the acts already mentioned, appears designed to effect no particular purpose. The houses, when they have stood for some time, and been kept in repair, become so firm from the consolidation of all the materials, as to require great exertion and the use of the ice-chisel or other iron instruments to be broken open. The laborious nature of such an undertaking may easily be conceived, when it is known that the tops of the houses are generally from four to six feet thick at the apex of the cone. Hearne relates having seen one instance in which the crown or roof of the hut was more than eight feet in thickness.

The door or hole leading into the beaver-hut is always on the side farthest from the land, and is near the foundation of the house, or at a considerable depth under water. This is the only opening into the hut.

The large houses are sometimes found to have projections of the main building thrown out, the better to support the roof, and this circumstance has led to all the stories of the different chambers or apartments in beaver-huts. But these larger edifices, so far from having several apartments, are either double or treble houses, each part having no communication with the other, except by water. Upwards of twelve such dwellings have been seen under one roof, and, excepting two or three of them, the whole of the remainder had no communication unless by water, each having its own door into the dam, which is doubtless well known to the inmates, who may have comparatively little intercourse with each other. It is a fact that the musk-rat is sometimes found to have taken up his abode in the huts of the beaver; the otter also occasionally intrudes his company. The latter animal, however, is a dangerous guest, for, if provision grow scarce, it is not uncommon for him to devour his host.

The northern Indians believe that the beaver always thicken the northern walls of their houses much more than the others, in order more effectually to resist the cold. In consequence of this belief, these Indians always break into the huts from the south side.

All the beavers of a community do not co-operate in the fabrication of houses for the common use of the whole. Those which are to live together in the same hut, labour together in its construction, and the only affair in which all seem to have a joint interest, and upon which they labour in concert, is the dam, as this is designed to keep a sufficient depth of water around all the habitations.

These animals also have excavations in the adjacent banks, at rather regular distances from each other, which have been called *washes*. These excavations are so enlarged within, that the beaver can raise his head above water in order to breathe without being seen, and when disturbed at their huts, they immediately make way under water to these washes for greater security, where they are more readily taken by the hunters and trappers.

The number of young produced by the beaver at a litter is from two to five. Females have been killed in which six young were found, but this occurred only in two instances out of many hundreds examined at different stages of gestation. During the season of union, the voice of both sexes resembles a groan, the male having a much hoarser note than the female. The young beavers whine in such a manner as closely to imitate the cry of a child. Like the young of most other animals they are very playful, and their movements are peculiarly interesting, as may be seen by the following anecdote, related in the narrative of Captain Franklin's perilous journey to the shores of the Arctic Sea.—"One day a gentleman, long resident in the Hudson's bay country, espied five young beavers sporting in the water, leaping upon the trunk of a tree, pushing one another off, and playing a thousand interesting tricks. He approached softly, under cover of the bushes, and prepared to fire on the unsuspecting creatures, but a nearer approach discovered to him such a similitude betwixt their gestures and the infantile caresses of his own children, that he threw aside his gun and left them unmolested."

The beaver swims to considerable distances under water, but cannot remain for a long time without coming to the surface for air. They are therefore caught with greater ease, as they must either take refuge in their vaults or washes in the bank, or seek their huts again for the sake of getting breath.

In a few years, comparatively speaking, the beaver has been exterminated in all the Atlantic and in the western states, as far as the middle and upper waters of the Missouri; while in the Hudson's bay possessions they are becoming annually more scarce, and the race will eventually be extinguished throughout the whole continent.

The bait which is used to entice the beavers is prepared from the substance called castor (*castoreum*,) obtained from the glandulous pouches of the male animal, which contain sometimes from two to three ounces. This substance is called by the hunters *bark*-stone, and is squeezed gently into an open-mouthed phial.

The castor, whose odour is similar to tanner's ooze, gets the name of *bark*-stone from its resemblance to finely powdered bark. The sacks containing it are about two inches in length. Behind these, and between the skin and root of the tail, are found two other oval cysts, lying together, which contain a pure strong oil of a rancid smell.

The traits of character exhibited by the beaver in captivity are not very strikingly peculiar, though sufficiently interesting. It learns to obey the voice of its master, is pleased to be caressed, and cleanly in its habits. Hearne states that he has kept various individuals about his house during his residence at Hudson's bay, and remarks, "they made not the least dirt, though they were kept in my own sitting room, where they were the constant companions of the Indian women and children, being so fond of their company that when the Indians were absent for any considerable time, the beaver discovered great signs of uneasiness, and on their return showed equal marks of pleasure by fondling on them, crawling into their laps, laying themselves on their backs, sitting erect like a squirrel, and behaving to them like children that see their parents but seldom. In general during the winter they lived on the same food as the women did, and were remarkably fond of rice and plumb-pudding. They would eat fresh venison and partridges very freely, but I never tried them with fish, though I have heard they will at times prey on them."

FIG. 2. *Musk-rat, of the United States. Mus Zibethicus,* LINN. *Fiber Zibethicus,* CUV.

The musk-rat, says the same authority, which is so closely allied in form and habits to the beaver, does not, like that timid animal, retire from the vicinities inhabited by man, but, relying on its peculiar instinct for concealment, remains secure, notwithstanding the changes induced by cultivation, and multiplies its species in the very midst of its enemies. Thus, while the beaver has long since entirely disappeared and become forgotten in the Atlantic states, the musk-rat is found within a very short distance of our largest and oldest cities,[*] and bids fair to maintain its place in such situations during an indefinite future period.

The musk-rat owes this security to its nocturnal and aquatic mode of life, as well as to the peculiar mode in which its domicil is constructed. Along small streams, mill-races, and ponds, where the banks are of some elevation and strength, the musk-rats form large and extensive burrows. These have the entrance always in the deep water, so as to be entered or left without betraying the presence of the animal. The mouth of the burrow ascends from its commencement near the bottom, and slopes upwards until it is above the level of the high water. The burrow then extends to great distances, according to the numbers or necessities of the occupants. Like most other animals residing in such burrows, they frequently excavate them beneath the roots of large trees, where they are perfectly secure from being disturbed by having their burrows broken into from above.

The injuries done by the musk-rat to the banks thrown up to exclude the tide from meadows and other grounds, are frequently very extensive. The tide encroaches more and more on the burrow as the soil softens and is washed away; the animals extend their excavations in various directions, in order to free themselves from the inconvenience of the water, and at length, from the co-operation of both causes, the bank caves in and the water is allowed free access, often laying waste the most valuable parts of the farm. To understand the extent to which such mischief may be carried, it is sufficient to take a walk along the banks thrown up to protect the meadows on the Delaware, on both sides of the river. Similar, though not as extensive injury, is produced along the borders of ponds, races and small streams, by the caving in of the burrows formerly tenanted by the musk-rat.

Where musk-rats frequent low and marshy situations, they build houses, which, in form and general appearance, resemble those made by the beaver. These edifices are round, and covered at top in form of a dome, and are built of reeds, flags, &c. mingled with mud. Instead of one place of entrance and exit, there are several subterraneous passages leading in different directions, and as these are extensive, the musk-rats when disturbed take refuge in them. Numerous individuals, composing several families, live together during the winter season; but, in the warm weather the house is entirely deserted, and the musk-rats live in pairs and rear their young, of which they have from three to six at a litter.

The musk-rat builds in a comparatively dry situation, at least not in a stream or pond of water, but in the marsh or swamp. He requires no dam, and does not, like the beaver, lay up a stock of winter provision, neither does he erect so strong and durable a dwelling, as it is not to be repaired, but deserted for a new one the following season.

The musk-rat feeds upon the roots, &c. of aquatic plants, and is especially fond of the acorus verus, or calamus aromaticus, which grows abundantly in most of the marshy vicinities inhabited by the musk-rat. It has been imagined that this animal feeds also upon fish, merely from its habit of living much in the water. There is the same reason for believing that the beaver is pisciverous, an opinion which the structure of the teeth, stomach and intestines of both animals, sufficiently contradicts.

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[*] Within a mile of Philadelphia, on every side, this animal may be found, along the banks of all the streams emptying into the Delaware and Schuylkill.

The musk-rat is an excellent swimmer, dives well, and remains for a considerable length of time under water. It is rare to have an opportunity of seeing the animal during the day time, as it lies concealed in its burrow, but by watching during moonlight nights, in situations not much frequented by human visitors, the musk-rat may be seen swimming in various directions, and coming on shore for the sake of seeking food, or for recreation.

The musk-rat has its nose thick and blunt at the end, and short ears, nearly concealed in fur. Its body and head very much resemble those of the beaver, but differ from it in colour, being a reddish brown. The belly and breast are ash colour, mingled slightly with ferruginous. The feet and tail of the musk-rat are also remarkably different from those of the beaver; all the toes are free and unconnected. On the hinder, instead of a web uniting the toes, there is a stiff fringe of bristly hair, closely set and projecting from the sides of the toes. The tail is thin at the edges, compressed so as to be vertically flattened, covered with small scales, having a slight intermixture of hair, and is about nine inches long, being nearly of the length of the body, which measures about twelve inches from the end of the nose to the root of the tail. The powerful odour of musk renders the flesh of the musk-rat of little value, and few can eat it. The skin is highly valued on account of the fineness of its fur.

FIG. 3. *Common*, or *Norway Rat. Mus. Decumanus.* LINN. and CUV.

Among quadrupeds this rat may be considered as occupying the same rank as the crow does among birds. He is one of the most impudent, troublesome, mischievous, wicked wretches, that ever infested the habitations of man. To the most wily cunning he adds a fierceness and malignancy of disposition that frequently renders him a dangerous enemy, and a destroyer of every living creature he can master. He is a pure thief, stealing not merely articles of food, for which his hunger would be a sufficient justification, but substances which can be of no possible utility to him. When he gains access to the library, he does not hesitate to *translate* and appropriate to his own use the works of the most learned authors, and is not so readily detected as some of his brother pirates of the human kind, since he does not carry off his prize entire, but cuts it into pieces before he conveys it to his den. He is, in short, possessed of no one quality to save him from being universally despised, and his character inspires no stronger feeling than contempt, even in those who are under the necessity of putting him to death.

The common, brown, or Norway rat, now so extensively diffused over this country, is not indigenous to our soil, but was introduced from Europe, which received it from Asia in the eighteenth century, as late as the year 1750. There are few parts of the world now visited by navigators where this animal has not been introduced, and the immediate consequence of its introduction has been, that all the native rats have been destroyed, or obliged to withdraw beyond the reach of this subtle and implacable enemy.

Prior to the year above mentioned, this rat, now so notorious for its ravages, was almost, if not wholly, unknown in Europe. It was conveyed to England, about the period above-mentioned, in the timber-ships from Norway, and hence it has received one of its common names. Many years subsequently it was brought to this country in European ships, and has been gradually propagated from the sea-ports over the greater part of the continent.

The brown rat takes up its residence about the wharves, store-houses, cellars, granaries, &c. and destroys the common black rat and mouse, or entirely expels them from the vicinities it frequents. To chickens, rabbits, young pigeons, ducks, and various other domestic animals, it is equally destructive when urged by hunger and opportunity. Eggs are also a very favourite article of food with this species, and are sought with great avidity; in fact, everything that is edible falls a prey to their voracity, and can scarcely be secured from their persevering and audacious inroads. In the country they take up their abodes according to convenience and the abundance of provision, infesting especially mills, barns, and out-houses, or residing in holes along the banks of races and other water-courses.

The brown rat swims with great facility, and dives with vigour, remaining under water for a considerable time, and swimming thus to some distance. When attacked and not allowed an opportunity of escaping, he becomes a dangerous antagonist, leaping at his enemy and inflicting severe and dangerous wounds with his teeth. The most eager cat becomes immediately intimidated in the presence of one of these rats thus penned up, and is very willing to escape the dangers of an encounter.

The brown rat is amazingly prolific, and but for its numerous enemies, and its own rapacious disposition, would become an intolerable pest. Happily for the world, in addition to man, to the weazel, cat, some species of dog, &c. rats frequently find destructive enemies in each other, both in the adult and young state, their numbers thus being prevented from becoming such an intolerable grievance as they otherwise necessarily would. The strongest of the species prey upon the weaker, and are the most merciless destroyers of their own kind. The weazel and the terrier are the most efficient rat-killers, as the first can pursue the enemy to his most secret retreat, and the second derives from his superior strength and activity a very decided advantage in the contest. The cat, though in general a very useful auxiliary in lessening the number of this species, is very liable to be foiled and worsted in her attempts.

The cunning of these rats is not less than their impudence; it is almost impossible to take them in traps after one or two have been thus caught, as the rest appear perfectly to understand the object of the machine, and afterwards avoid it with scrupulous care, however tempting may be the bait it contains. The surest way to remove them is by poison, which, however, they frequently detect and avoid. The powder of nux vomica, mixed with some Indian corn or oat-meal, and scented with oil of rhodium, is found very effectual in destroying them. Arsenic is very commonly used in the same way for this purpose, but the fatal accidents which frequently occur when this poison is kept about the house, in consequence of the label being removed or changed, and the arsenic administered to members of a family instead of some other medicine, render it a very objectionable resource.

The brown rat measures about nine inches, and is of a light brown colour, intermingled with ash and tawny. The colour of the throat and belly is of a dirty white, inclining to gray. It has pale, flesh-coloured, naked feet, with a tail of the same length as the body, and covered with small dusky scales, with short hairs thinly scattered between.—*Godman.*

FIG. 4. *Common Mouse. Mus Musculus*, LINN. and CUV.

This well-known little animal is spread over all parts of the globe, and seems to follow the habitations of man, however remote. It is naturally an extremely timid creature; but if laid hold of, will bite with great keenness. The mouse breeds very rapidly, producing from five to eight at a birth; and the young are capable of breeding at the age of three months.* It is too well known to require any particular description.

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* "The propagation of mice, (μυεσ) in comparison with that of other animals, is very remarkable both for quickness and profuseness. A pregnant female was shut up in a chest of grain; in a short time a hundred and twenty individuals were counted."—*Aristotle, Hist. of Animals, Book* vi. *chap.* 37.

Musical Mouse.

"On a rainy evening, in 1817," says Dr. Archer, of Norfolk, "as I was alone in my chamber, I took up my flute, and commenced playing. In a few minutes my attention was directed to a mouse that I saw creeping from a hole, and advancing to the chair in which I was sitting. I ceased playing, and it ran precipitately back to its hole; I began again shortly afterwards, and was much surprised to see it reappear, and take its old position. The appearance of the little animal was truly delightful; it couched itself on the floor, shut its eyes, and appeared in ecstacy. I ceased playing, and it instantly disappeared again. This experiment I repeated frequently with the same success, observing that it was always differently affected, as the music varied from the slow and plaintive, to the brisk or lively. It finally went off, and all my art could not entice it to return."

Fig. 5. *German Hamster Rat. Mus Cricetus*, Linn. *Cricetus Vulgaris*, Cuv.

The hamster is about the size of the brown rat, but considerably thicker in the body, and shorter in the legs, and its tail only about three inches in length. The colour on the back and upper parts of the body, is pale reddish brown, and black beneath. On each side of the body are three pretty large white patches, that on the shoulders the largest. The muzzle is whitish, with a reddish tinge on the cheeks. This species, however, sometimes varies in colour. The male is always larger than the female.

This destructive animal is a native of Austria, Silesia, and other parts of Germany, Poland, Russia, and the southern confines of Siberia. They live in burrows, which they dig obliquely downwards, to the depth of three or four feet. These consist of several apartments, some for the residence of themselves and their young, and others as storehouses for their provisions, which they take care to provide for themselves abundantly before the winter sets in. Their food principally consists of grain and roots; and in summer, they feed on green herbs, along with grain; sometimes preying on the smaller animals. "In harvest time," says Mr. Allamand, "he makes his excursions for provisions, and carries every article he can find into his granary. To facilitate the transportation of his food, nature has provided him with two pouches in the inside of each cheek. On the outside, these pouches are membranous, smooth, and shining; and, in the inside, are a great many glands, which continually secrete a certain fluid, to preserve their flexibility, and to enable them to resist any accidents which may be occasioned by the roughness or sharpness of particular grains."

The males never live with the females, nor assist in the construction of their burrow. The female breeds three times a-year, producing five or six at a birth. The young grow very rapidly, and are soon able to provide for themselves.

When the hamster digs his burrow deep into the earth, he generally spends the winter in a state of torpidity; and, if found in this lethargic state, its animation is so completely suspended, that the electric shock may be given, without arousing it.

The hamster is said to be a fierce and unsociable animal, and makes an obstinate defence when attacked. They prey on every animal weaker than themselves; and even their own species are not safe from these attacks. Their destruction of grain some years is excessive. One year, in Gotha, 11,564 skins were delivered at the Hotel de Ville, where this creature is proscribed for its destructive propensities; the following year, 54,429 were brought; and the year after, the amazing number of 80,139.

M. Ray observes, that the hair of this animal is so closely united to the skin, that it cannot be pulled off without great difficulty, on which account it is held in high estimation by the people of eastern countries, particularly in China, to which country numbers of their skins are annually sent, and bring a pretty high price. This fur is seldom used in Europe, as it has an unpleasant smell.

Fig. 6. *Canada Rat. Mus Bursarius*, Linn. *Geomys Bursarius*, Cuv.

The pouched-rat, though long since noted by various observers, is still but little known, even in the vicinities where it is most common. Its peculiar mode of life, its nocturnal habits and vigilance, unite to secure it from the view of incidental observers, and those who are desirous of becoming acquainted with this rat in a state of nature, must be prepared to exercise the most untiring patience as well as the most assiduous attention.

In Florida, Georgia, &c., and the plains adjacent to the Missouri, the pouched-rat is to be found in great numbers; their burrows are exceedingly numerous in various places, and give an appearance to the plains similar to that produced by ploughing. Over their burrows, hillocks of loose earth are raised, resembling in some respects those thrown up by the shrew-mole. These hillocks consist of about ten or twelve pounds of loose earth, which appears as if it had been emptied out of a flower-pot on the spot; no hole is to be discovered under this mass of loose soil, but if it be carefully removed, it is seen that the earth has been broken in a circle of an inch and a half in diameter, within which space the ground is loose, but still without any distinct opening.

This species is rendered peculiar in its appearance by the cheek-pouches exterior to the mouth, its short fore legs and long claws. By the aid of the latter the animal is enabled in a light soil to burrow with great rapidity, and is seldom or never dug out, since it can escape through the ground as fast as one person can dig in pursuit.

The pouched-rat is covered by a reddish brown hair, which is lead-coloured at base; on the under parts of the body the colour is somewhat paler; the feet are white. The eyes are black; the ears scarcely prominent, and the cheek-pouches, which are hairy internally and externally, are very capacious. The whiskers are numerous, slender and whitish. The feet are five-toed, the anterior pair being robust, with large, elongated, somewhat compressed nails, exposing the bone on the inner side; the middle nail is much the longest, then the fourth, then the second, then the fifth, the first being very short. The hind feet are very slender, with nails concave beneath and rounded at tip, the exterior one being very small; the tail is short, hairy at base, and nearly naked at its tip.—*Godman.*

Fig. 7. *Cape Mole Rat. Mus Capensis*, Linn. *Bathyergus Capensis*, Cuv.

This animal is scarcely as large as a Guinea-pig; brown, with a spot round the ear, another round the eye, and a third on the vortex, together with the end of the muzzle, white. The incisors are smooth.

PLATE LXXII.—ORNITHOLOGY.

Order Grallae. Genus Ardea, or Crane.

Fig. 1. *White Stork. Ardea Ciconia*, Linn. *Ciconia Alba*, Cuv.

The Storks reside in marshy places, and are principally nourished by reptiles, frogs, and their fry, as well as fish and small mammalia. In most countries they are much esteemed by the inhabitants, as they tend to prevent the increase of noxious vermin by destroying great numbers, all the species being extremely voracious. They migrate in great flocks, and are very easily tamed.

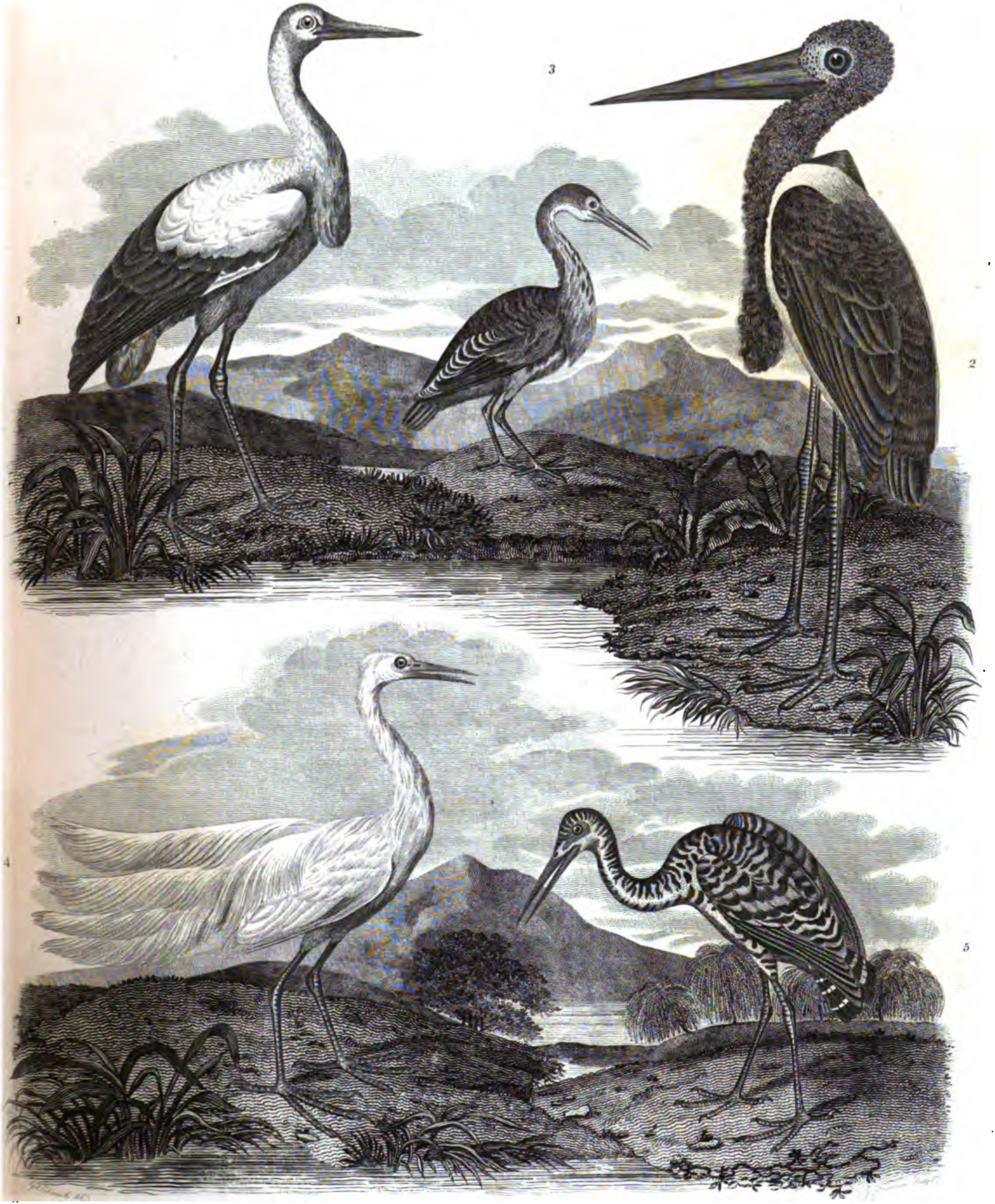
This well-known bird has the head, the neck, and the whole of the body, of a pure white: the scapulars and wings black: the beak and legs red: the naked space round the eyes black:

Linn Syst.

ORNITHOLOGY.

PLATE 72.
of Order Gr.

Order GRALLÆ.



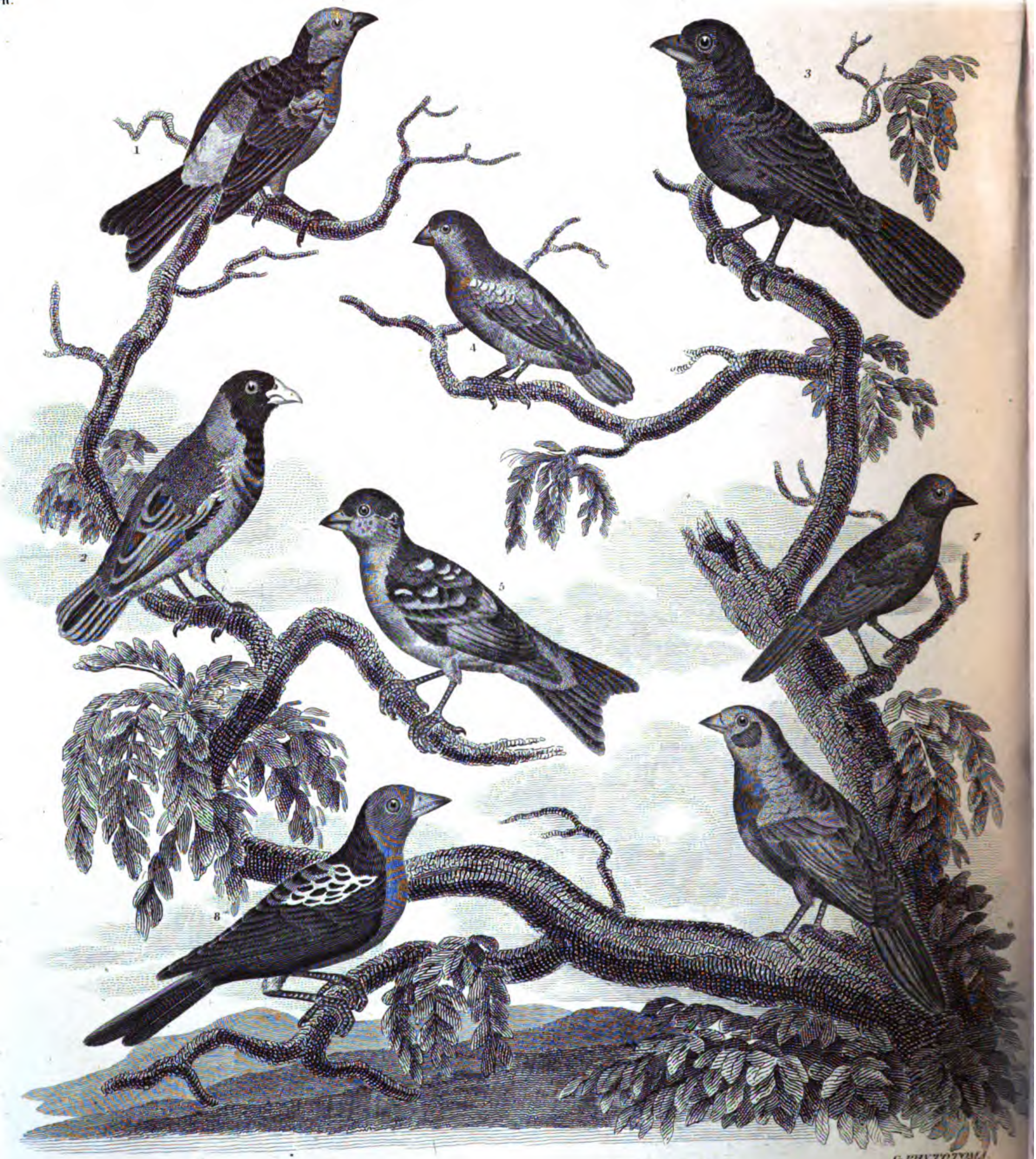
GENUS *ARDEA*
Crane

1 *A. Ciconia* — WHITE STORK
2 *A. Dubia* — GIGANTIC HERON
3 *A. Exilis* — MINUTE BITTERN
4 *A. Egretta* — GREAT EGRET
5 *A. Tigrina* — TIGER BITTERN.

ORNITHOLOGY.

Div. 1st Land Birds _ Order 3d. PASSERES.

Linn. Syst.



G. TANAGRA. (Tanager)

1. T. *Tatao.* PARADISE T.

2. T. *Capitalis.* CAPITAL T.

3. T. *Jacapa.* RED BREASTED.

GENUS *FRINGILLA.* (Finch)

4. F. *Ignita.* FIRE FINCH.

5. F. *Flammea.* CRIMSON CROWNED F.

6. F. *Bengalus.* BLUE BELLIED F.

7. F. *Psittacea.* PARROT F.

G. PHYTOTOMA.

8. P. *Rara.* CHILI PHYTOTOMA.

the irides brown: it is in length about three feet five or six inches. The young have the black on the wings tinged with brown, and the beak of a dusky red.

The Stork inhabits various parts of the temperate regions of the old continent. It rarely visits England, though in various parts of France and in Holland; it breeds everywhere on the house tops, the inhabitants providing boxes for the purpose, and are careful that the birds receive no injury: the consequence of this is that the Stork walks fearlessly along the streets of those parts, and is greatly valued by the inhabitants, as it clears the country of frogs, snakes, and other reptiles. The disposition of this bird is mild and placid, being very easily tamed; it may be trained to reside in gardens, which it will effectually clear of insects and other vermin.

The female makes a large nest composed of sticks, and lays from two to four eggs, which are of a dirty yellowish white, the size of those of a goose, but rather longer. The young are hatched in a month, and at first are brown: both sexes are said to watch them by turns, till they are able to take care of themselves: from this circumstance, and their great familiarity, many ridiculous fables have been invented, which it would be needless to repeat.

Storks are birds of passage, and observe great exactness in the time of their autumnal departure from Europe to more congenial climates. They pass a second summer in Egypt and the marshes of Barbary. In the former country they are said to pair and lay again, and educate a second brood. Before each of these migrations, they congregate in amazing numbers: they are for a while much in motion among themselves, and after making several short excursions, as if to try their wings, all of a sudden take flight, with great silence, and with such speed as in a moment to be out of sight. During these migrations they are seen in vast flocks. Dr. Shaw saw three flights of them leaving Egypt, and passing over Mount Carmel, each half a mile in breadth; and he says, they were three hours in passing over.

The Stork sleeps upon one leg, and previous to its migrations makes a singular snapping noise with its beak; in doing this it is said to turn its head backwards, with the upper part of the beak placed on the rump, and the under set into the quickest motion, made to act on the other. The flesh of this bird is very rank, and is not fit for food.

Fig. 2. *Gigantic Heron. Ardea dubra*, Linn. *Ciconia argala*, Cuv. The *Adjutant* of Bengal.

This bird is a native of Africa and Asia: it arrives in Bengal at the commencement of the rainy season. It is a most voracious animal, eating as much as would serve four men at a meal, and is very useful in clearing the country of reptiles and snakes, upon which it feeds. A long account of a tame bird of this species is given by Latham, from Smeathman. It regularly attended the hall at dinner-time, placing itself behind its master's chair, frequently before any of the guests entered. The servants were obliged to watch it carefully, and to defend the provisions by beating it off with sticks; yet, notwithstanding every precaution, it would frequently snatch off something from the table. It one day purloined a whole boiled fowl, which it swallowed in an instant. It used to fly about the island, and sat very high amongst the silk cotton-trees; from this station, at the distance of two or three miles, it could see when the dinner was carried across the court; when darting down, it would arrive early enough to enter with some of those who carried in the dishes.

When sitting, it was observed always to rest itself on the whole length of the hind part of the leg. It sometimes stood in the room for half an hour after dinner, turning its head alternately, as if listening to the conversation.

Its courage was not equal to its voracity, for a child of eight or ten years old was able to put it to flight, though it would seem at first to stand on the defensive, by threatening with its enormous beak, widely extended, and crying out with a loud hoarse voice. It preyed on small quadrupeds, birds, and reptiles; and though it would destroy poultry, it never dared openly to attack a hen with her young ones. It had been known to swallow a cat whole, and a bone of a shin of beef being broken, served it but for two morsels.

Fig. 3. *Minute Bittern. Ardea Exilis*, Linn. and Cuv.

This bird is the size of a thrush; length eleven inches and a half. Its colours vary in different individuals. Most frequent in Jamaica, and the warm climates of the West Indies and South America.

Fig. 4. *Great Egret. Ardea Egretta*, Linn. and Cuv.

This fine species has the whole of the plumage of a pure white, with a slight hanging crest on the head: many of the feathers on the back are elongated, and measure nearly a foot and a half in length; their shafts are strong and straight, and their webs are long, very slender, and wedged, as are also the feathers of the crest: the beak is bright yellow: the naked space about the eyes is green: the irides are bright yellow: the legs are dusky, or dusky green: the length of this bird is about three feet six inches. The young, before the age of three years, and the old, during the period of moulting, are of a pure white; they do not possess the crest or the long dorsal feathers: the former have the upper mandible of the beak black at its point and along the ridge, and during the first year it is entirely dusky yellow, with the plumage dirty white: the feet are greenish: the irides bright yellow.

This bird is found in various parts of the south of Europe, and in the young state has been recorded as a British bird, but upon questionable authority. It is very numerous in Asia and in some parts of Africa, and is likewise stated to be found in America. It frequents marshy places, and shelters itself among reeds: it lays from four to six greenish eggs.

Fig. 5. *Tiger Bittern. Ardea Tigrinia*, Linn. and Cuv.

This highly interesting species is greatly allied to the Brazilian Bittern: it is about two feet six inches in length: its beak is greenish: the irides are of a yellow tinge: the top of the head is black: the general colour of the plumage is deep rufous, varied with undulated zigzag lines, after the manner of the skin of the tiger; the throat and sides of the neck are paler, spotted irregularly with black: the chin is white: the under parts of the body are yellowish white, varied as the back: the vent is white: the tail is black, with four narrow white stripes: the legs are green.

This is a most beautiful bird; its manners greatly resemble those of the Common Bittern, frequenting the same situations, making its nest on the ground, and laying seven or eight whitish eggs, spotted with green. It is an inhabitant of several parts of South America, especially Cayenne and Surinam.

PLATE LXXIII.—ORNITHOLOGY.

Land Birds.

Order Passeres. Genus Tanagra. Fringilla and Phytotoma.

Fig. 1. *Paradise Tanager. Tanagra Talao*, Linn. and Cuv.

This most elegant species is described in Dr. Latham's Synopsis as being "somewhat less than a Goldfinch: length near six inches: beak black: the upper part and sides of the head yellowish green: the feathers small, and seem distinct from each other: the hind part of the head and neck, the upper part of the back and scapulars, of a velvety black: the lower part of the back and rump of a bright fire-colour, verging to orange towards the tail: the throat and fore-part of the neck glossy violet blue: breast, belly, sides, and vent, sea-green: thighs dull green: the lesser wing-coverts green gold; the middle ones blue; and the greater violet blue: the quills black, with blue margins: the second quills, tail, and legs, black. The female and young males differ from the above description, as they have not the fire-colour on the lower part of the back: the male gains this at a mature age, but it is ever wanting in the female, as that part is wholly of an orange-colour, and in general the whole plumage is less brilliant; not but both males and females vary much, as some of them have been seen of a bright red both on the back and rump, while others have those parts wholly of a golden yellow."

This bird appears in large flocks in the neighbourhood of Cayenne, about September, and frequents a particular large tree when the fruit is just set, upon which it commits its depredations: it remains there about six weeks, and returns in April and May, when the fruit is ripe: it is only found about this one tree: in confinement it will feed on bread and meal, but it has no song. It is very common in the inhabited parts of Guiana at certain seasons.

Fig. 2, *Capital Tanager. Tanagra Capitalis*, Linn. and Cuv.

The locality of this beautiful species, which was in the late Leverian Museum, is unknown: it is in length five inches: its beak is dusky lead-colour: the head, throat, and all the fore-part of the neck, as far as the breast, black: the upper part of the neck behind, its sides, and all the under parts of the body, are of a fine yellow, inclining to orange on the breast: the rest of the plumage is of a pale olive green, with the wings and tail darkest, and bordered with yellow: legs flesh-colour.

Fig. 3. *Red-breasted Tanager. Tanagra Jacapa*, Linn. and Cuv.

This species of Tanager is abundant in Cayenne, Guiana, Mexico, and other parts of America, within the tropics: it is a very sociable bird, and frequents gardens and such like places, generally in pairs: the female constructs a cylindrical nest, composed of dried leaves and fibres, and lined with large leaves; it has the opening beneath, and is attached to the horizontal branch of some low trees: the female lays two white eggs, marked at the larger ends with small dull red spots.

The bird is described as the size of a Sparrow, and being in length six inches and a half: its beak is black, with the base rather lighter, and rounded with a silvery gloss: the irides are brown; the prevailing colour of the plumage is black, with a strong purplish cast, the chin, throat, and breast, excepted, which are fine crimson, as is also the forehead in some individuals: legs brown.

Fig. 4. *Fire Finch. Fringilla Ignita*, Linn. and Cuv.

The Fire Finch is the size of the lesser Redpole: beak dusky yellowish at the base: the prevailing colour of the plumage glossy brownish red: the vent darkest: quills and tail dusky: legs flesh colour: female pale reddish brown: forehead, and between the eyes, crimson: tail reddish, dusky at the tip. Inhabits Gambia.

Fig. 5. *Crimson-crowned Finch. Fringilla flammea*, Linn. *Corythus flammea*, Cuv.

The Crimson-crowned Finch is above four inches in length: beak pale brown: top of the head of a bright crimson; the feathers rather inclining to a crest: upper parts of the body brown; under parts pale rose-colour: legs pale brown. Said by Linnæus to inhabit Nordland.

Fig. 6. *Blue-bellied Finch. Fringilla Bengalus*, Linn. *Linaria Bengalus*, Cuv.

Length near five inches: beak whitish: irides hazel: head, and upper parts of the body, gray; on each side of the former, behind the eyes, a lunulated purplish red spot: quills brown, with gray edges: lower part of the back and rump, and all the under parts of the body, blue; tail the same, but paler: legs whitish: female without the reddish spot on the sides of the head. This species is liable to a few slight variations, which are scarcely worth description, as the above will apply to all. Native of Africa.

Fig. 7. *Parrot Finch. Fringilla Psittacea*, Linn. *Carduelis Psittacea*, Cuv.

This beautiful species is a native of New Caledonia: in length about four inches: beak black: face, throat, rump, and tail, bright scarlet: rest of the body of a beautiful green, lightest beneath: outer edge of the quills green; the inner gray-brown: wings reach to the base of the tail, which is wedge-shaped, and has the two middle feathers bright scarlet, with brown shafts; the other five on each side have only the outer web scarlet, the inner being brown.

Fig. 8. *Chili Phytotoma*, or *Plant-cutter. Phytotoma rara*, Linn. and Cuv.

The Chili Plant-cutter is the size of a Quail: beak serrated on the edges, very strong, and pointed at the tip, in length half an inch: tongue very short, and obtuse: irides brown: upper parts of the body obscure dusky gray; under parts paler: quills and tail-feathers spotted with black: tail of moderate length, and rounded: feet with four toes, placed three before and one behind; the latter one much shorter than the rest.

This bird is very common in Chili: it builds its nest in high trees, in sequestered places: its eggs are white, with red spots: it feeds on vegetables, preferring those parts that are near the root, and it digs about and cuts off the plants close to the ground with its beak, as if it had been done with a saw; for which it is much detested by the inhabitants, as it does great mischief to their gardens: it has a rough voice, and is almost continually uttering the word *Ra-ra* very distinctly, from whence the specific name has arisen.

PLATE LXXIV.—ICHTHYOLOGY.

The genus Sparus among fishes, belongs to the order *Thoracici*. In the Linnean system, it has the following characters; teeth generally strong, the grinders being somewhat obtuse and crowded; the lips are doubled, and the gill-membrane five-rayed; the cover is scaly, and the body compressed; the pectoral fins are rounded, and the lateral line curved on the hind part.

This genus embraces numerous species, of which the annexed plate illustrates six of the most striking.

Fig. 1. *Sparus falcatus*, Linn. Native of the American seas.

Fig. 2. *Sparus surinamensis*, Linn. Size and shape of a Perch: a native of Surinam.

Fig. 3. *Sparus fasciatus*, Linn. *Cheilinus fasciatus*, Cuv. Native of Japan.

Fig. 4. *Sparus chrysurus*, Linn. *Mesoprion chrysurus*, Cuv.

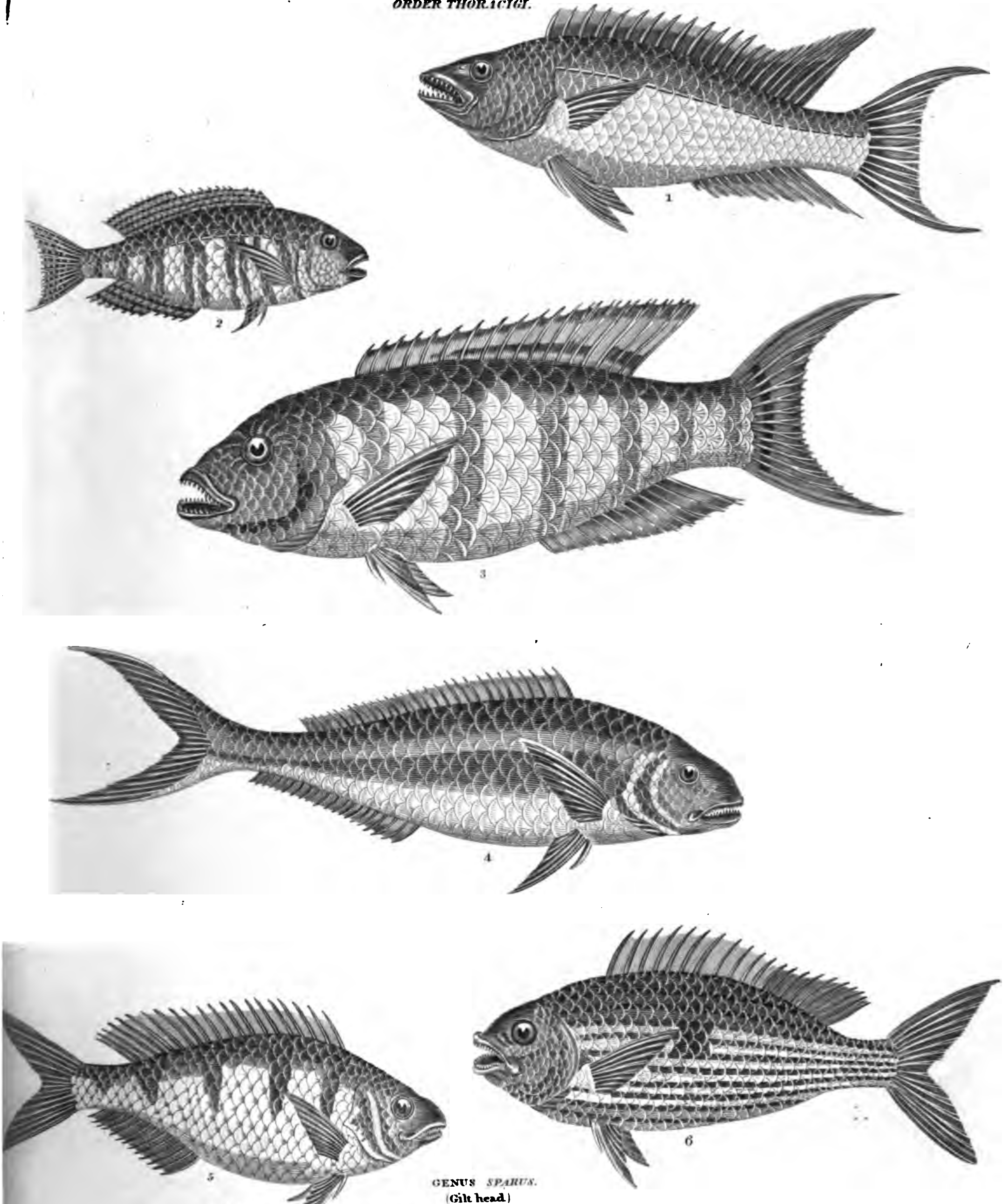
Fig. 5. *Sparus annularis*, Linn. Cuv. Yellowish, with a black spot near the tail. It resembles the common Perch, but is much less esteemed for the table. It inhabits the Mediterranean.

Fig. 6. *Sparus Mæna*, Linn. *Mæna vulgaris*, Cuv. The body is variegated, and there is a black spot on each side. It inhabits the Mediterranean.

To this genus belongs the *Perca Scandens*, or Red Sparus, *Sparus Sigillatus* of Linnæus, which is remarkable for its power of climbing. This it performs by the assistance of the spines of its gill covers, moving itself at pleasure up the stems of trees near the waters it frequents. In this situation it was discovered at Tranquebar, by Lieutenant Daldorff, who com-

ICHTHYOLOGY.

ORDER THORACICI.



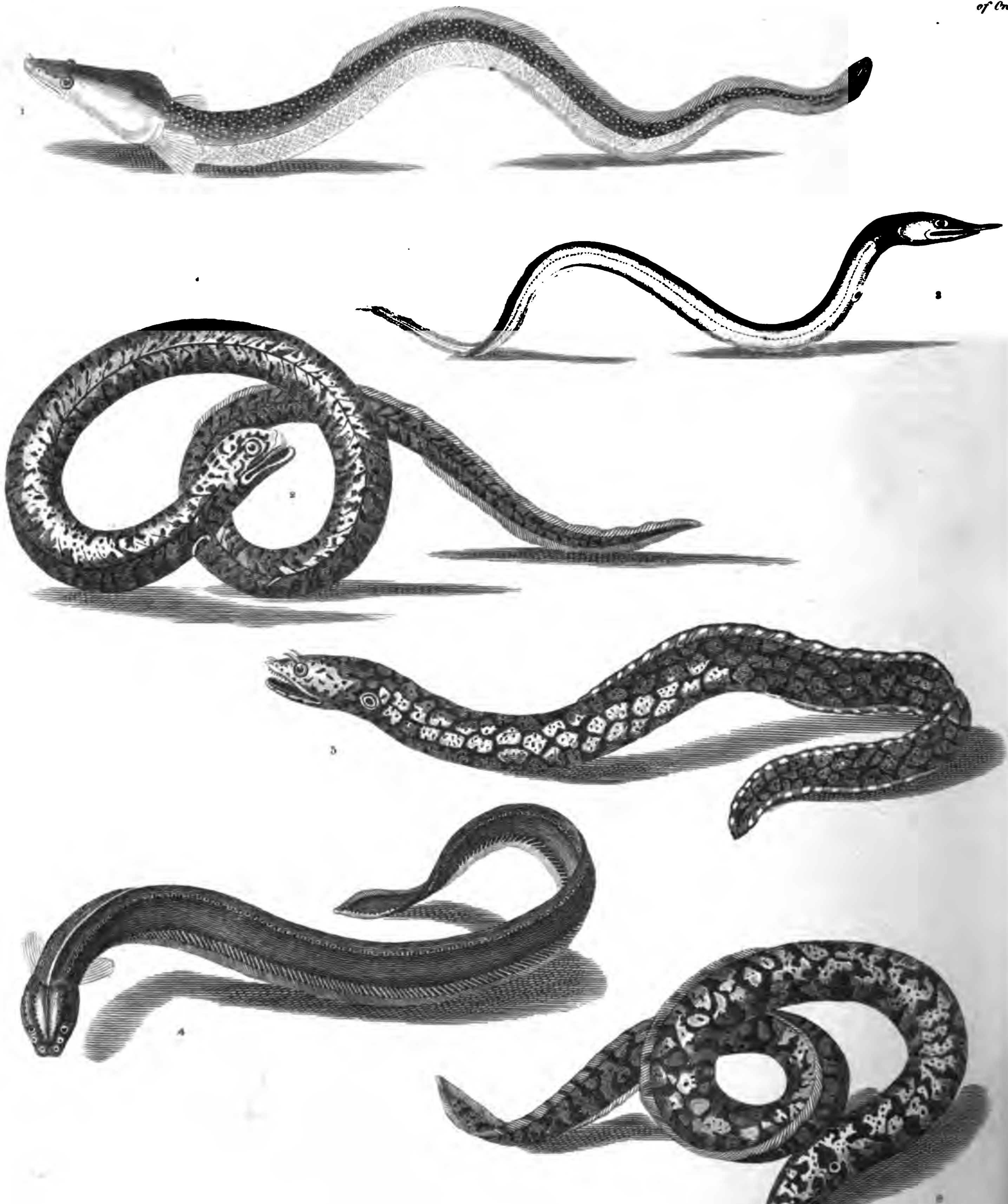
GENUS *SPARUS.*
(Gilt head.)

1. S. *falcatus.* 2. S. *Surinamensis.* 3. S. *fasiatus.* 4. S. *Chryssurus.* 5. S. *annularis.* 6. S. *mena.*

FALCATED G. SURINAM G. BANDED G. GOLDENTAIL G. ANNULATED G. CACKEREL G.

ICHTHYOLOGY.

Linn. Syſt. *ORDER APODES.* ***PLATE***
of Order Apo.



G. *MURÆNA*	G. *SYNBRANCHUS*	G. *SPHAGEBRANCHUS*	G. *GYMNOTUS*	GENUS *GYMNOTHORAX*	
1. M. *Anguilla*	2. Syn. *Marmoratus*	3. Spha. *Rostratus*	4. Gym^s. *Electricus*	5. Gymn^x. *Muræna*	6. Gymn^x. *Catenatus*
EEL MURÆNA	*MARBLED SYNBRANCHUS*	*SNOUTED SPHAGEBRANCHUS*	*ELECTRIC GYMNOTUS*	*EEL GYMNOTHORAX*	*CHAIN GYMNOTHO^x.*

J.L.Fred

municated its description to Sir Joseph Banks. It was seen ascending a fissure in the stem of a palm, growing near a pool of water, and was observed to move itself forwards by alternately applying the spiny sides of the gill-covers to the sides of the fissure, assisting itself at the same time by the spines on each side of the tail, and had already ascended to the height of more than five feet above the water, when it was first observed. It was found to be very tenacious of life, moving about on dry sand many hours after it was taken. The spines of the gill-covers are considered, by the natives, of a poisonous nature.

Dr. Shaw tells us of another fish, that, on throwing a species of the cyclopterris lumpus into a pail of water, it fixed itself so firmly to the bottom, that by taking hold of the tail, he lifted up the pail, although it contained some gallons of water. But if we are astonished that a fish should climb a tree, we may be still more so to learn that another should live for days on land, and possess the power of locomotion like a land animal. This curious fish is called Harlequin Angler, the ***Sophius histrio.*** Its appearance is grotesque and singular: the pectoral fins resemble short arms, and are palmated at their tips. These fins have two bones in them, like the radius and ulna; but Cuvier says, that they are, more strictly, bones of the carpus. M. Renau, in his history of fishes, affirms that he knew an individual of this species, and that he saw it for three days out of the water, walking about the house in the manner of a dog. The circumstance of its walking out of the water, says Sir John Bell, in his Bridgewater treatise on the hand, has some interest, as showing relations between organs which are apparently the least connected.

PLATE LXXV.—ICHTHYOLOGY.

The genus MURÆNA, or Eel, belongs to the Linnean order ***Apodes***, and possesses the following generic characters: head smooth; nostrils tubular; gill-membrane with ten rays; eyes covered with a common skin; body round, smooth, mucous; caudal, dorsal, and anal fins, united; spiracle behind the head or pectoral fins.

This genus appears to make a near approach to the reptile class; for in the eel, as in reptiles, the body is long, slender, and flexible; and, excepting the small pair of pectoral fins, it may be said to be without fins, inasmuch as three of the latter just mentioned are united by a continuous web, which surrounds a large portion of the body.

These animals can reside either in salt or fresh water; and, what is still more surprising, they are in some measure independent of either; for they have been known to leave their native element, and wander during the night along the moist meadows, not only for a change of habitation, but, it is supposed, in quest of prey. It has a proverbial tenacity of life; for after it has been skinned, and even cut to pieces, some remains of vitality may often be observed.

FIG. 1. ***Muræna Anguilla***, LINN. ***Anguilla Vulgaris***, CUV. The common Eel of Europe.

This species has a uniform whitish or brownish colour, a large, pointed head, and very small eyes placed near the nose. It is viviparous, producing its young towards the end of summer. In some parts of Europe, the Eel fishery is of great importance. Dr. Bloch says, that in some places near the mouths of the Baltic, so great a quantity is taken, that they are salted for exportation, and conveyed by wagon-loads into Saxony, Silesia, &c.

The genus SYNBRANCHUS has been separated, by naturalists, from Muræna, on account of the spiracles, or branchial orifice, being single, and situated beneath the throat.

FIG. 2. ***Synbranchus Marmoratus***, CUV. Marbled with blackish spots, the body being yellowish beneath. It attains a length of thirty inches, and has the habits of an eel. Inhabits the fresh waters of Surinam.

The genus SPHAGEBRANCHUS, of ***Blainville***, differs from Muræna, by the approximation of the branchial openings on the throat.

FIG. 3. ***Sphagebranchus Rostratus***, BLAIN. CUV. ***Snouted Gymnote.*** A native of Surinam.

The genus GYMNOTUS of ***Linnæus***, has the gills partly closed by a membrane, as in Anguilla, but opening before the pectorals; anal fin occupying the greater part of the inferior surface of the body, and most frequently extending to the end of the tail: no dorsal fin whatever.

FIG. 4. ***Gymnotus Electricus***, LINN. CUV. ***Electrical Gymnote.*** This species is also called the ***Electrical Eel.*** It is from five to six feet long, and communicates such violent shocks that men and horses are struck down by them. This power is dependent on the will of the animal, which can give it what direction it pleases, and render it effective, even at a distance. It is, however, dissipated by use; and to renew it, the gymnotus requires rest and nourishing food. The organ which is the seat of this singular faculty, extends along the whole under side of the tail, occupying about half its thickness: it is divided into four longitudinal fasciculi; two large ones above, and two smaller ones below. Each fasciculus is composed of numerous parallel, membranous laminæ, nearly horizontal, and closely approximated to each other, and these again are decussated by transverse laminæ; so that numerous cells or canals are formed, filled with a gelatinous matter.

The electric power of the Gymnotus is apparently designed to aid it in procuring food, the smaller fishes being instantly struck motionless on approaching it. It inhabits the waters of Surinam.

The genus GYMNOTHORAX is characterized by a want of the pectoral fins, whence it was thought by M. Bloch, that they ought not to be associated with the Eel, the Conger, and other fishes possessing these fins. M. Cuvier, however, has classed the two following species with the Linnean genus ***Muræna***, or Eel.

FIG. 5. ***Gymnothorax Muræna***, BLOCH. ***Muræna Helena***, CUV. This is the ***Roman Eel***, or Muræna of the ancients, a fish of excellent flavour, and celebrated by their writers as one of the greatest luxuries of the table.

Hirius was the first among the Roman epicures who constructed reservoirs for the Muræna, and his example soon became general. Pliny relates the well-known story of Vedius Pollio, who was in the habit of causing his offending slaves to be thrown into the eel-ponds, to be devoured. This Vedius Pollio was one of the favourites of the emperor Augustus. The latter, without knowing the cruelty of Pollio, one day honoured him with his presence at a feast. A slave broke a splendid crystal vase, when the enraged master ordered him to be carried from his presence, and thrown to the eels; but the slave, in a transport of despair, threw himself at the emperor's feet, and begged for any death, rather than be eaten by fishes. The emperor, astonished at his request, inquired respecting this extraordinary mode of punishment; and, on learning the truth of the matter, ordered all the crystal vessels of Pollio to be broken in his presence, and his reservoirs to be filled up; at the same time, he gave freedom to the slave, and only spared the life of the offending noble in consideration of his former friendship.

This species is common in the south of Europe.

FIG. 6. ***Gymnothorax Catenatus***, BLOCH. ***Muræna Catenata***, LINN. Variegated brown, with white, chain-shaped spots, or bands. It inhabits the waters of Surinam.

PLATE LXXVI.—ENTOMOLOGY.

The genus Scarabæus of *Linnæus*, or the *Beetle*, belongs to the order Coleoptera, and is characterized as follows: the antennæ are clavate; the club is lamellate; they have four feelers, and the fore shanks are generally toothed. M. Latreille has divided this genus into several smaller sections, established on certain anatomical peculiarities.

Fig. 1. *Scarabæus Chorinæus*, Linn. Lat.

Fig. 2. *Scarabæus Tityus*, Linn. Lat.

Fig. 3. *Scarabæus Hercules*, Linn. Lat. This huge species is a native of several parts of South America, where great numbers are said to be sometimes seen on a tree called the mammœa, rasping off the rind of the slender branches with their horns, till they cause the juice to flow, which it devours greedily. The Hercules, from its great size, affords an admirable example of the characters of the true Scarabæi.

Fig. 4. *Scarabæus Carnifex*, Linn. *Phanæus Carnifex*, Lat. Male.

Fig. 5. Same—female. The thorax of this species is angular and rough, and its head is furnished with a long inflected horn. Like the dung-beetle, it forms round balls of excrementitious matters, in which it deposits its eggs. It inhabits tropical America.

Fig. 6. *Scarabæus Molossus*, Linn. *Copris Molossus*, Lat.

Fig. 7. *Scarabæus Sacer*, Linn. *Ateuchus Sacer*, Lat. *Sacred Beetle* of the Egyptians.

Two species of Beetle were worshipped by the ancient Egyptians, and formed a part of their system of hieroglyphics. They were sculptured in various positions, and sometimes of gigantic dimensions, on their monuments: they were also figured on the most precious materials, such as gold and silver: they used them as seals and amulets, suspended on their necks; and even entombed them with their mummies.

The *Scarabæus Sacer*, of which the annexed is an accurate figure, is found not only in Egypt, but in the south of Europe generally.

PLATE LXXVII.—CRUSTACEA, INSECTS, &c.

Fig. 1. *Oniscus Crassipes*, Linn. *Cymothoa Crassipes*, Cuv.

Fig. 2. *Oniscus Oceanicus*, Linn. *Ligia Oceanica*, Cuv. This species inhabits the seas of Europe.

Fig. 3. *Oniscus Armadillo*. *Armadillo Vulgaris*, Cuv. This is the millepede, or medical wood-louse. It is capable of rolling itself into a globular form, like the armadillo; whence its name.

Fig. 4. *Oniscus Aquaticus*, Linn. *Asellus Aquaticus*, Cuv. This species abounds in stagnant waters, in many parts of Europe.

Fig. 5, 6. *Oniscus Psora*, Linn. *Cymothoa Psora*, Cuv. Inhabits Norway.

Fig. 7. *Oniscus Æstrum*, Linn. *Cymothoa Æstrum*, Cuv. Inhabits the European seas.

Fig. 8. *Monoculus Quadricornis*, Linn. *Cyclops Quadricornis*, Cuv. Inhabits the stagnant waters of Europe.

Fig. 9 and 10. *Monoculus Polyphemus*, Linn. *Limulus Polyphemus*, Cuv. This is the King-crab, or Horse-shoe, of the American fishermen, and the *Casserole* of the French. Savages employ the tail of this species, to point their arrows. It is so abundant on the sea-coast of New-Jersey, that hogs are there fed with them.

With respect to the genera *Oniscus* and *Monoculus* of Linnæus, it may be remarked, that that celebrated naturalist classed them among Insects, in his order *Aptera;* from which they have more recently been detached, and placed in the class of Crustaceous animals.

The genus *Scolopendra* of Linnæus, is a true insect, and is classed by Latreille in his first order, or *Myriapoda.*

Fig. 11. *Scolopendra Morsitans*, Linn. Lat. *Centipede.* These animals have quick motions, are carnivorous, avoid the light, and conceal themselves under stones, logs, in the crevices of ships, &c. They are much dreaded by the inhabitants of hot climates, where they attain a very large size, and are very venomous.

The genus *Julus* of Linnæus, also belongs to the order Myriapoda.

Fig. 12. *Julus Terrestris*, Linn. Lat. This species inhabits woods and sandy places, feeds on roots and fruits, and is common in Europe.

PLATE LXXVIII.—CONCHOLOGY.

Genus Chiton.

The individuals of this singular family have a range of testaceous, symmetrical scales, along the back of the mantle, but not occupying its whole breadth: the edges of the mantle are cariaceous, and furnished either with a naked skin, or little scales, or sometimes with spines, bristles, and noded projections. They belong, in Cuvier's system, to the third class of Molluscous animals, called Gasteropoda, the characters of which have been stated on a former occasion.

Fig. 1 and 2. *Chiton Aculeatus*, Linn. Lam.

The shell has eight scales, or valves, which are streaked; body somewhat aculeated; whence its name. It is an Asiatic species, and is called by Rumpfius, *Limax marina.*

Fig. 3. *Chiton Arundo*, Linn. Lam.

Fig. 4. *Chiton Squamosus*, Linn. Lam. This beautiful species chiefly inhabits the American seas.

Fig. 5 and 6. *Chiton Olivaceus*, Linn. Lam. The artist has done justice to this beautiful and rare genus.

PLATE LXXIX.—ZOOPHYTES.

The annexed plate represents several species of the genus Hydra of Linnæus. They belong to the class *Polypi* of Cuvier; have a gelatinous body, in which is a cavity that answers the purpose of a stomach. In fact, no animals are constructed with a greater degree of simplicity: a little gelatinous horn, whose edges are provided with filaments that act as tentacula, constitute their whole apparent organization. Notwithstanding this, they can both swim and crawl.

Fig. 1. *Hydra Viridis*, Linn. Cuv. It is of a light green colour, inhabits stagnant waters in the south of France, and is particularly common under the leaves of the *Lemnæ.*

Fig. 2. *Hydra Grisea*, Linn. Cuv. This species has the same habits and localities as the preceding.

Fig. 3. *Hydra Fusca*, Linn. Cuv. This species is more rare than the preceding, is of a gray colour, and about an inch in length. It inhabits France.

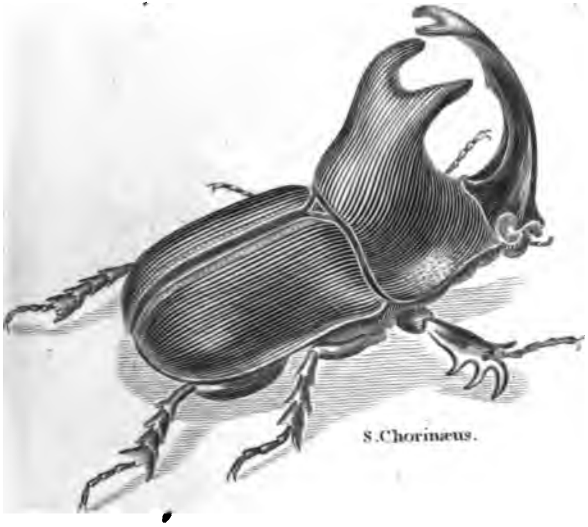
Linn. Syst.

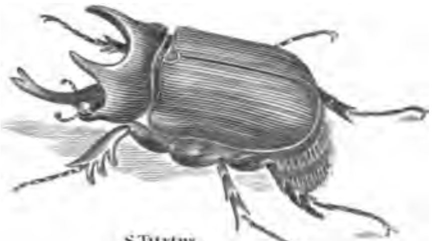
ENTOMOLOGY.

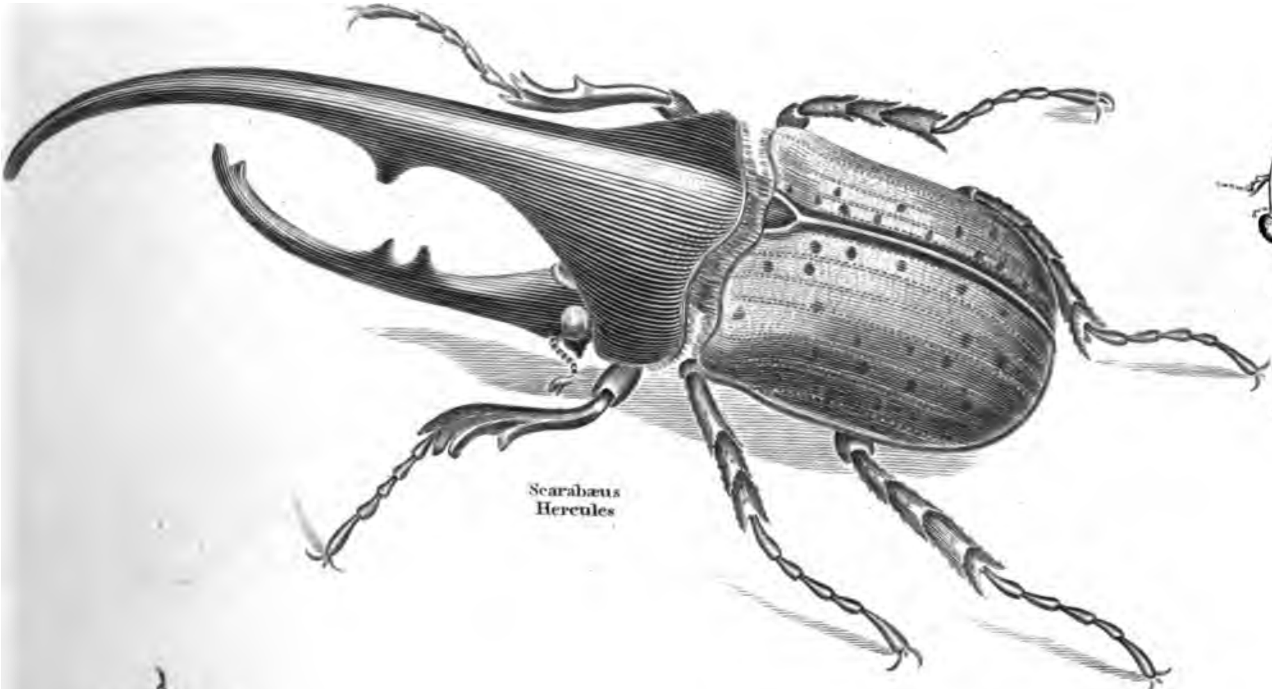
Order Coleoptera.

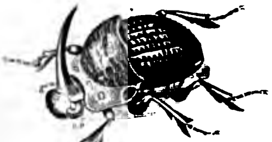
GENUS SCARAB.

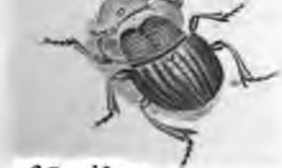
PLATE 76.

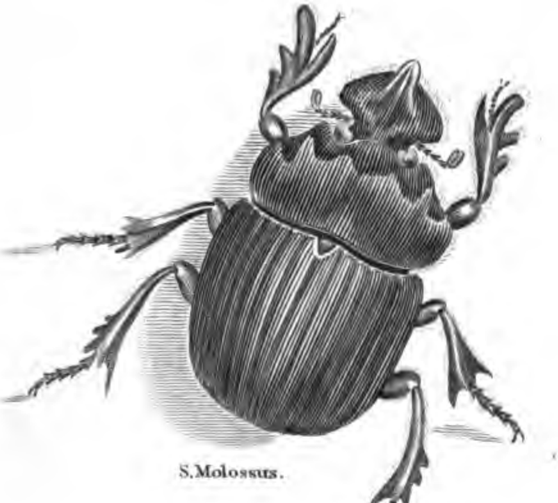

S. Chorinæus.

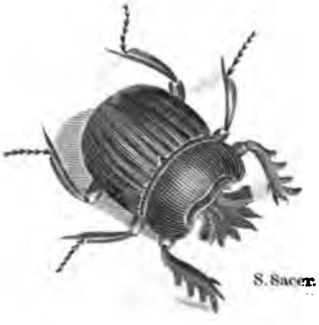

S. Tityus.


Scarabæus Hercules


S. Carnifex. *male*


S. Carnifex. *female*


S. Molossus.


S. Sacer.

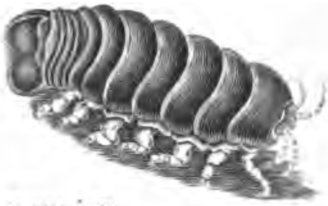
n.Syst.

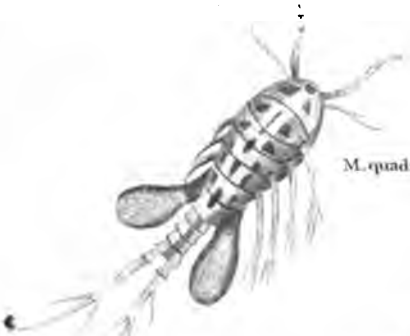
ENTOMOLOGY.

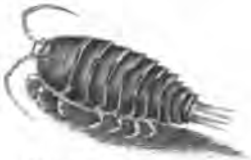
GENUS Monoculus. Oniscus. Scolopendra. Julus.

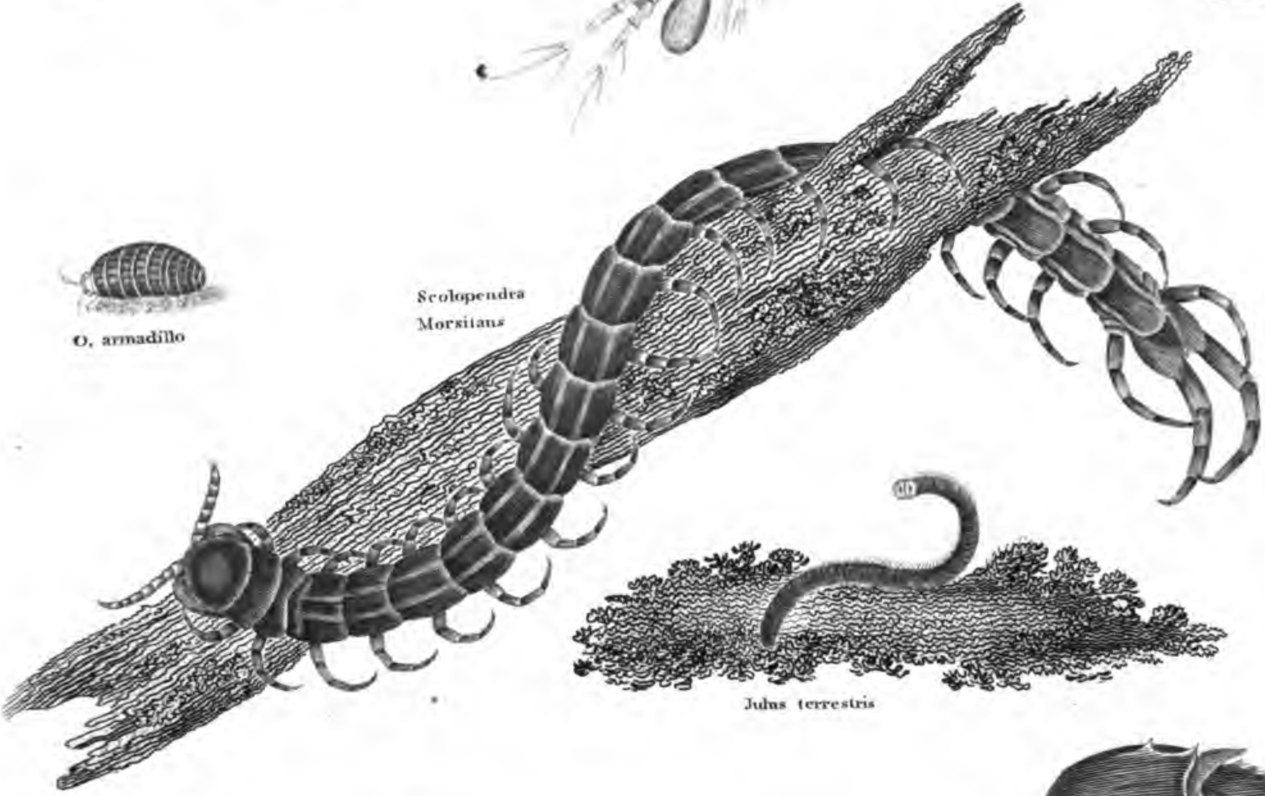
Order *APTERA*.

PLATE 77
of Order A.


O. crassipes

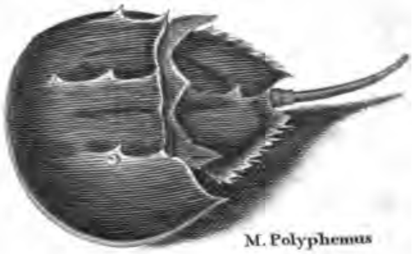

M. quadricornis

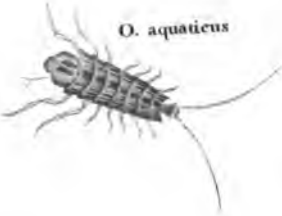

O oceanicus

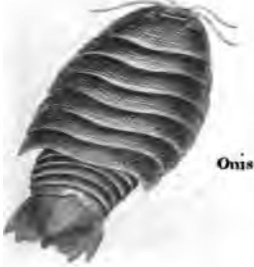

O. armadillo

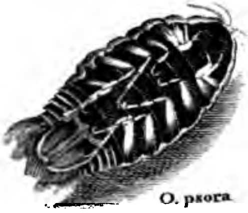
Scolopendra Morsitans

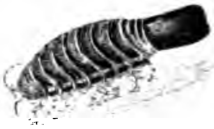
Julus terrestris

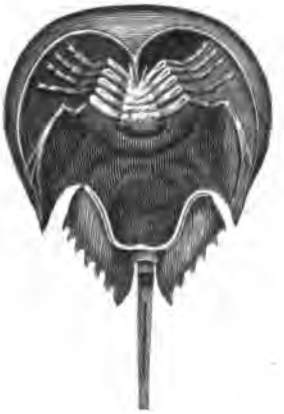

M. Polyphemus


O. aquaticus


Oniscus psora


O. psora


O. oestrum

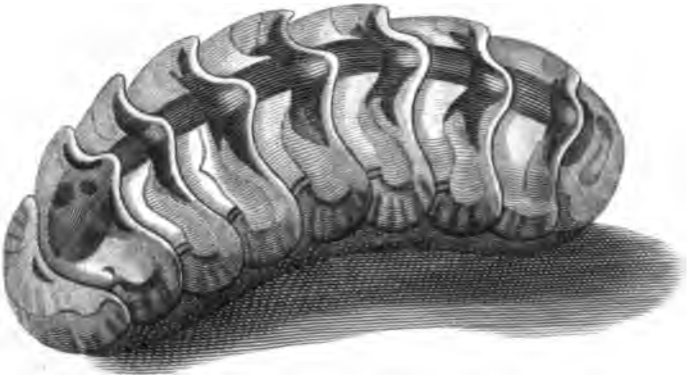

Monoculus Polyphemus

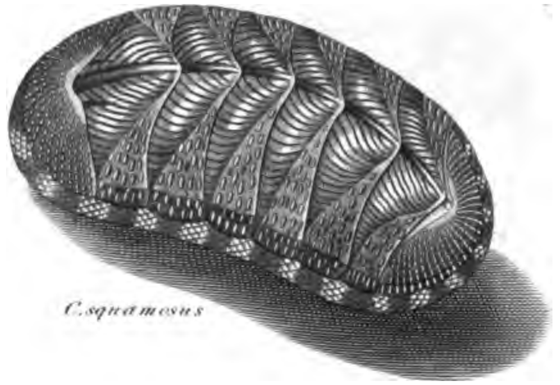
J.Boyd sc.

CONCHOLOGY.

GENUS CHITON

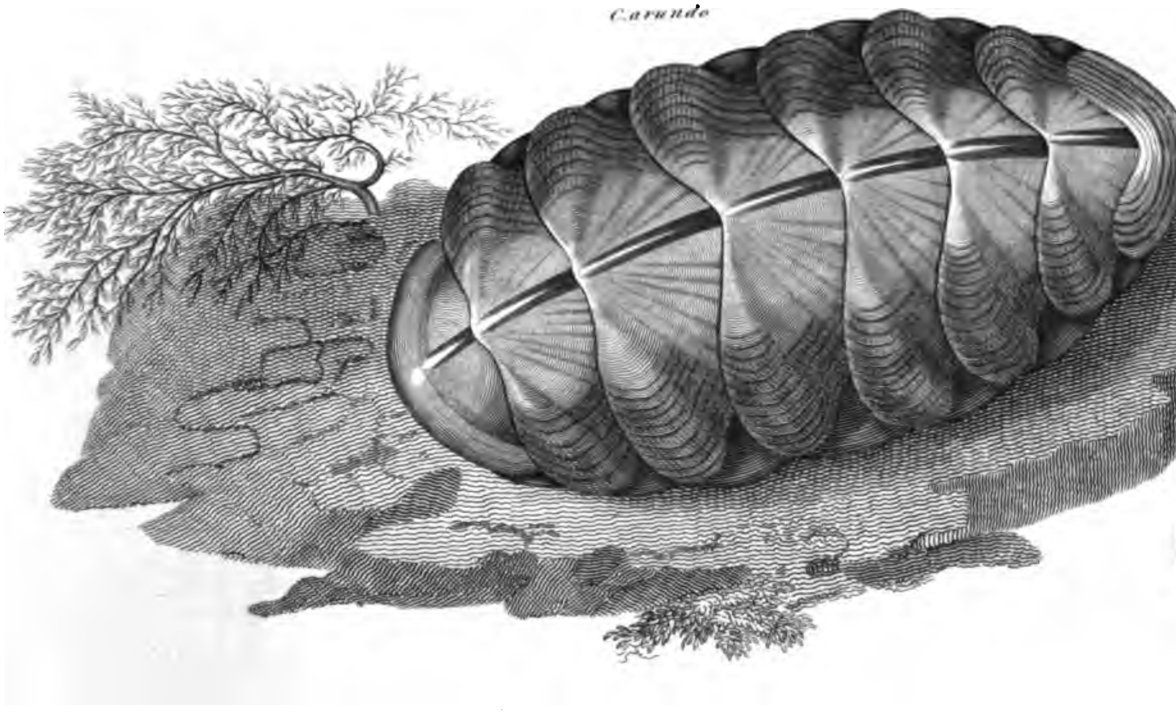
C. aculeatus

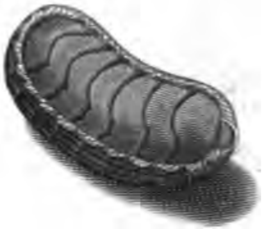




C. squamosus

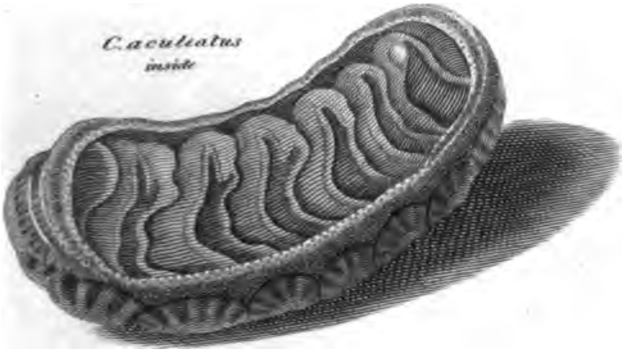
C. arundo



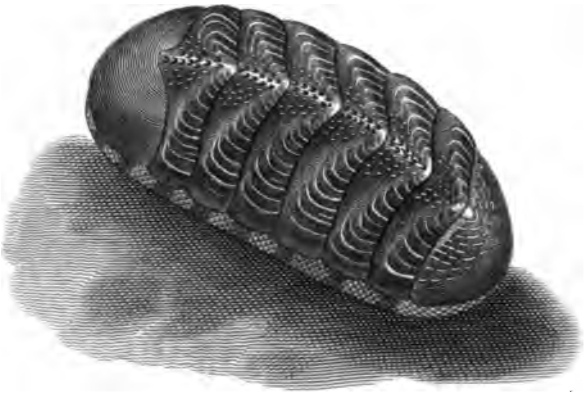


C. olivaceus
inside

C. aculeatus
inside



C. olivaceus



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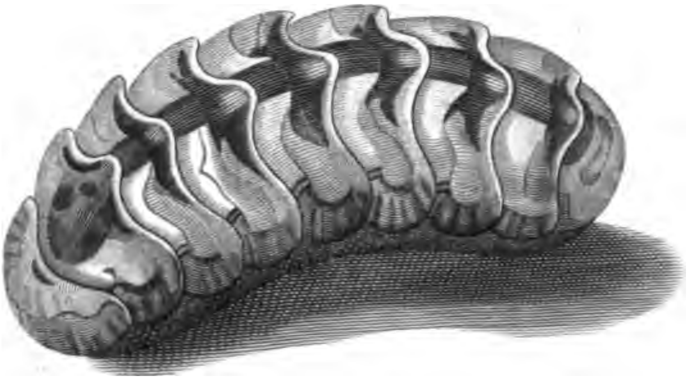
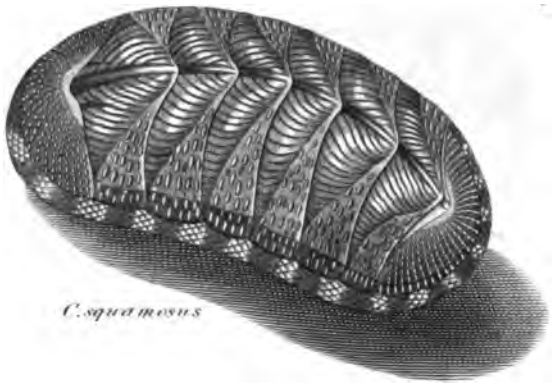
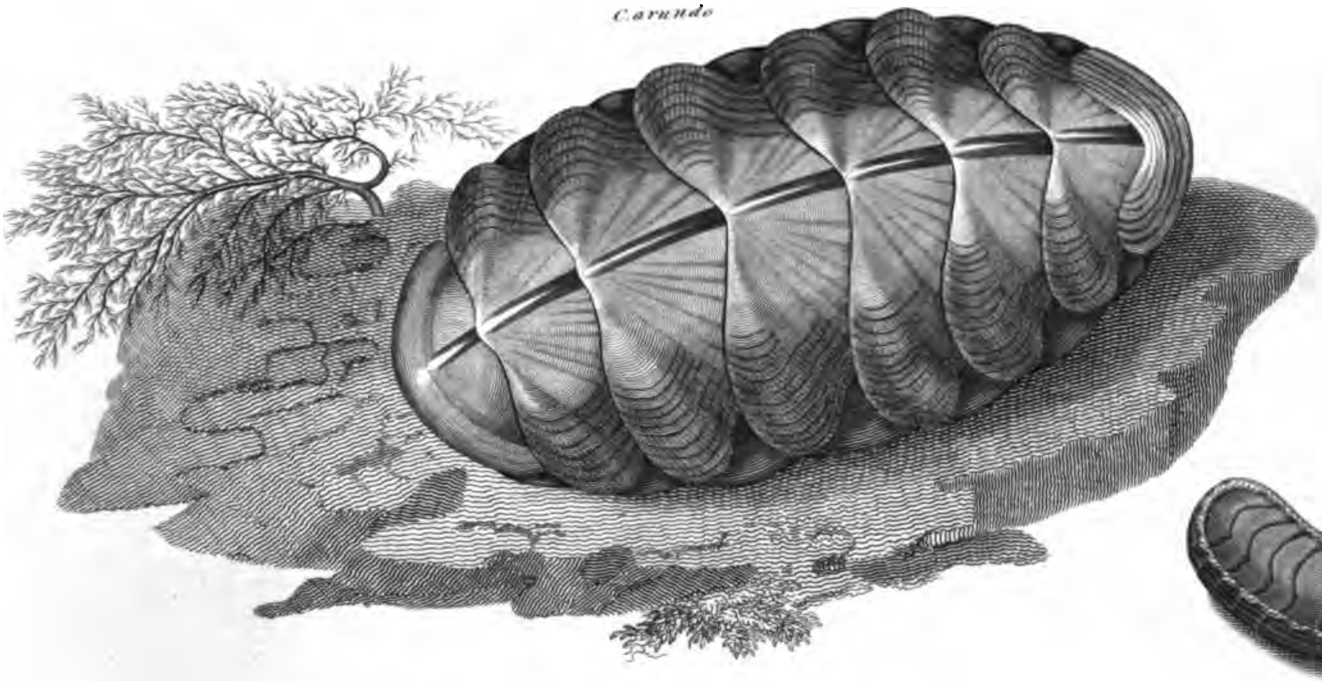
GENUS *CHITON*



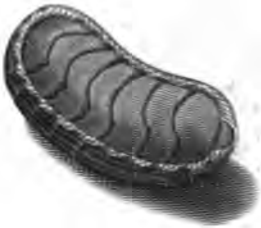
C. aculeatus



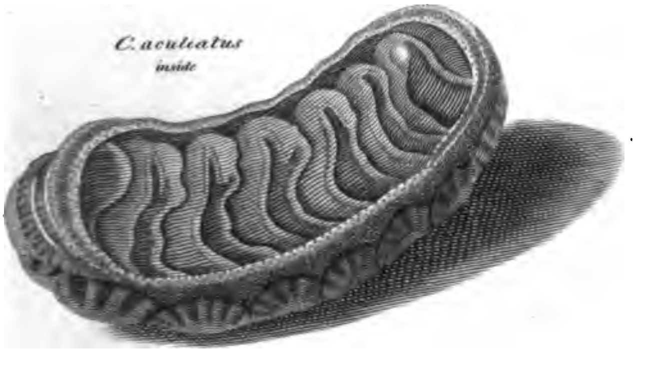
C. squamosus



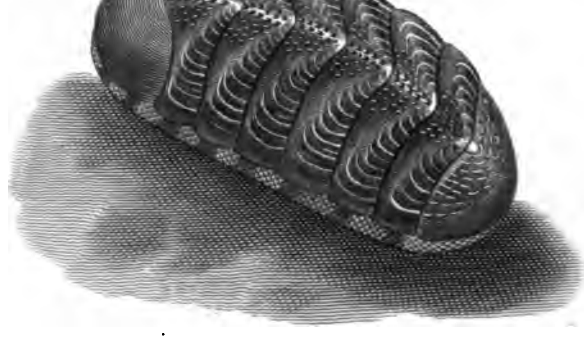
C. arundo



C. olivaceus inside



C. aculeatus inside



C. olivaceus

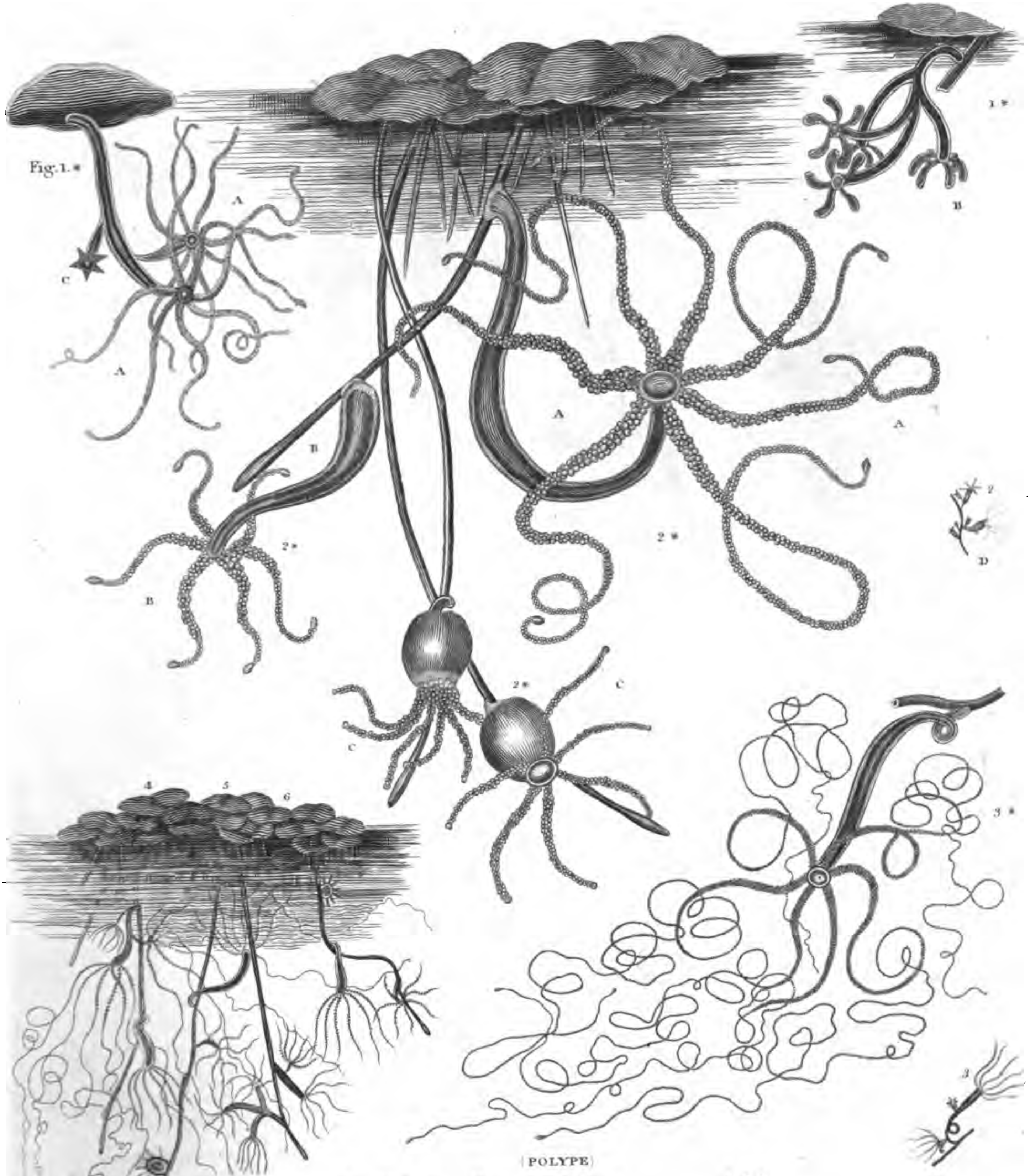
[illegible]

VERMES.

Order Zoophytes.

Genus *Hydra*.

PLATE 79.



(POLYPE)

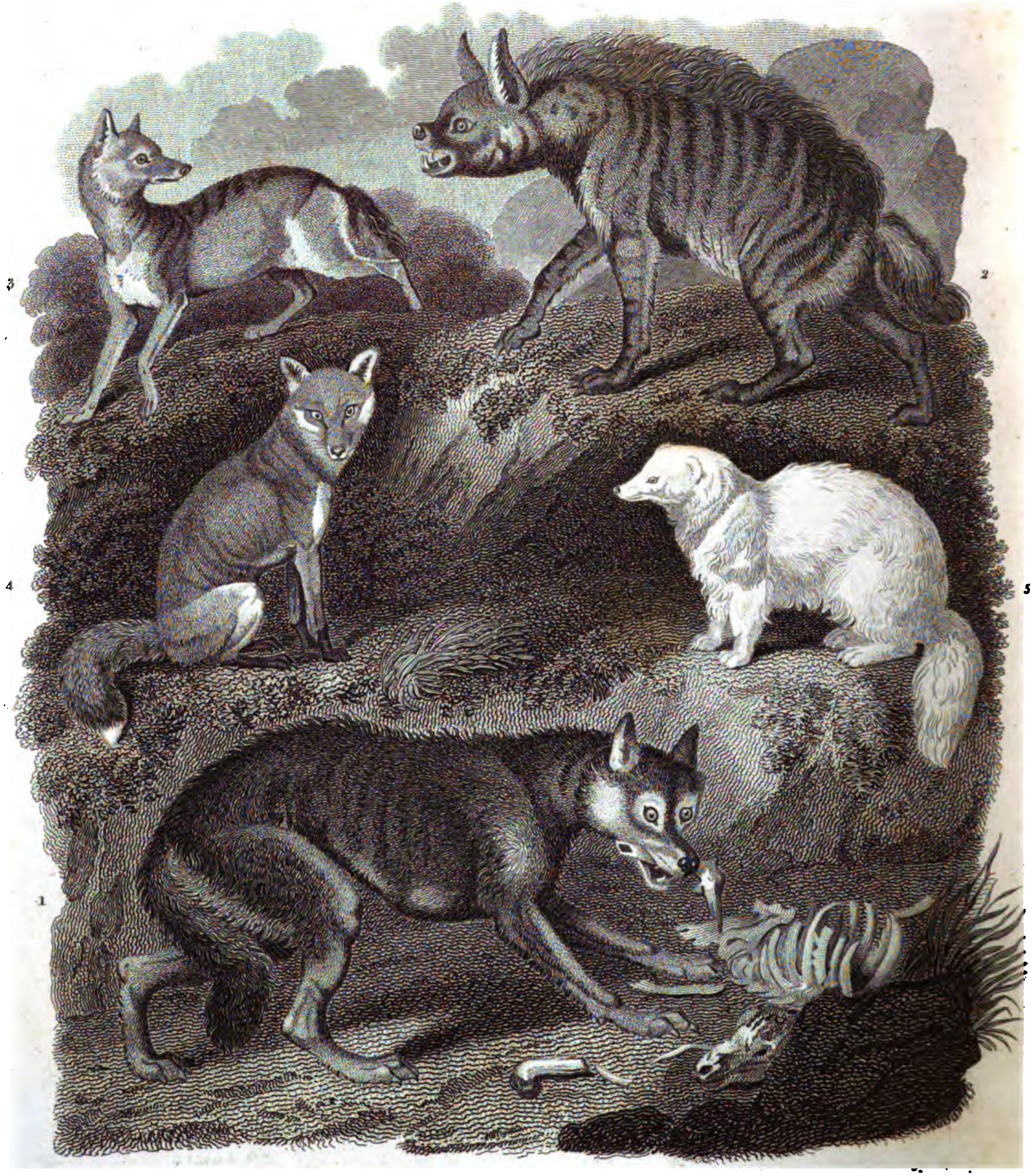
Fig. 1. H. viridis — Green P. 2. H. grisea — Grey P. 3. H. fusca — Brown P. 4. 5. 6. *Clusters of the three species nat. size.*

** magnified_A. extended Body & tentacula_B. subretracted_C. contracted_D. Young.*

Linn. Syst.

QUADRUPEDS.

CLASS MAMMALIA. ORDER FERÆ. GENUS CANIS.



1. Canis Lupus. Wolf. 2. C. Hyæna. Striped Hyæna. 3. C. Mesomelas. Cape Jackal.
4. C. Vulpes. Common Fox. 5. C. Lagopus. Arctic Fox.

PLATE LXXX.—QUADRUPEDS.

Class Mammalia. Order Ferae. Genus Canis.

Fig. 1. *Wolf. Canis Lupus*, Linn.

The specific characteristics of the wolf and dog are so nearly the same, that a particular description of its form is unnecessary. One of the principal distinctions is, that the eyes of the wolf are placed in a more oblique position than those of the dog, which gives it a look of savage fierceness; its tail is long and bushy, which it never carries erect, but always in a pendulous form, rather bending inwards between its hind legs.

Wolves vary considerably in colour and size, according to the species and variety. They are natives of every quarter of the globe, are possessed of great strength, and are most ferocious in their disposition; associating in large packs, often spreading desolation in the districts they invade; which is admirably depicted in the powerful language of Thomson:—

> By wintry famine roused, from all the tract
> Of horrid mountains, which the shining Alps,
> And wavy Apennine, and Pyrenees,
> Branch out stupendous into distant lands,
> Cruel as death! and hungry as the grave!
> Burning for blood! bony, and gaunt, and grim!
> Assembling wolves in raging troops descend;
> And, pouring o'er the country, bear along,
> Keen as the north wind sweeps the glossy snow—
> All is their prize.

With a savage and malignant disposition, the wolf is a cowardly animal, and always mistrustful; he conceives every object is a snare to entrap him. In Lapland, if he comes upon a reindeer tied to a post to be milked, he will not venture to approach it, lest the animal should be tied there as a decoy; but no sooner is the deer set at liberty, than he commences a pursuit, and destroys it. But should the deer get irritated, and stand at bay, the wolf instantly becomes intimidated. It is only through frequent disappointment, and the cravings of hunger, that the wolf evinces courage. In that case, he will brave every danger, and attack animals which are under the immediate protection of man; and even man himself frequently falls a victim to their united attacks. It is said, that after having tasted human blood, he prefers it to all other. This has given rise to many superstitious stories regarding him. The old Saxons believed that he possessed some evil spirit; hence their appellation, the *were wulf;* and the peasantry of many of the districts of France call him the *loupe garon*, for the same reason.

In all ages of the world, the wolf has been regarded as the implacable enemy of man; and all sorts of schemes have been invented to get rid of this ferocious brute; pitfalls, traps, and other engines of destruction, have been employed for his capture; and poison has also been successfully used. He has long been extirpated from the British islands.

In early times, wolves were very plentiful in England, and committed great havoc among the flocks. King Edgar, to encourage their destruction, in many cases commuted the punishment of criminals, into a requisition of a certain number of wolves' tongues from each, according to the degree of the offence. A Welch prince, who paid tribute to him, was oppressively ordained, instead of money, to produce, annually, three hundred wolves' heads—as noticed by the poet:—

> Cambria's proud kings (though with reluctance) paid
> Their tributary wolves; head after head,
> In full account, till the woods yield no more,
> And all the ravenous race extinct is lost.
>
> Somerville.

According to Hollinshed, the flocks in Scotland suffered much from the ravages of wolves, in 1577; and it was not till about a century afterwards, that they were wholly extirpated.

The wolf has great strength, especially in the muscles of his neck and jaws; he can carry a moderate-sized sheep in his mouth, and run off with it, without any difficulty.

The famale goes with young about three months and a half, and brings forth five or six young ones.

Although the wolf is an animal of a fierce and savage nature, yet he is capable of being tamed. Sir Ashton Lever had one whose savage propensities were entirely subdued; and there are many other instances on record. Buffon procured several while young, and brought them up, using gentle means to domesticate them. He states, that during the first year they were generally very docile, and would fawn upon him like a dog; but, at eighteen months, or two years, their savage nature began to betray itself, when it became necessary to chain them, to prevent their escape. Before this, he allowed them to range at large, and always kept them in a yard associated with poultry, which they never touched: however, one of them, when he was eighteen months old, for his first essay, attacked and killed the whole in a night, but did not eat one of them.

A Singular Device.—A singular circumstance, exhibiting in a remarkable degree the reflecting faculties of a wolf, is related as having taken place at Signy-le-Petit, a small town on the borders of Champagne. A farmer, one day, looking through the hedge of his garden, observed a wolf walking round about his mule, but unable to get at him, on account of the mule's constantly kicking with his hind legs. As the farmer perceived that his beast was so well able to defend itself, he considered it unnecessary to render him any assistance. After the attack and defence had lasted fully a quarter of an hour, the wolf ran off to a neighbouring ditch, where he several times plunged into the water. The farmer imagined he did this to refresh himself after the fatigue he had sustained, and had no doubt that his mule had gained a complete victory; but, in a few minutes, the wolf returned to the charge, and, approaching as near as he could to the head of the mule, shook himself, and spurted a quantity of water into the mule's eyes, which caused him immediately to shut them. That moment the wolf leapt upon him, and killed the poor mule before the farmer could come to his assistance.

Instance of Faithful Affection.—M. F. Cuvier relates the following instance of the fidelity and affection of a tame wolf, which was brought up like a dog, and became familiar with every person he was in the habit of seeing:—He followed his master everywhere, seemed to suffer grief for his absence, was obedient to his voice, and differed in nothing from the tamest of domestic dogs. His master, being obliged to travel, made a present of him to the Royal Menagerie at Paris. Here he was shut up in a compartment, and remained for many weeks, exhibiting every mark of grief, and almost without eating. In time, however, he attached himself to his keepers, and seemed reconciled to his fate, when, after an absence of eighteen months, his master returned. He took the earliest opportunity of visiting the menagerie, to see his favourite. At the first word he uttered, the wolf, though it did not see him in the crowd, recognized his voice, and testified his joy by motions and cries. Being set at liberty, he overwhelmed his master with caresses, like the most attached dog. His master being obliged to quit him a second time, the same melancholy symptoms appeared in the wolf, which, however, gradually wore off, and he resumed his wonted placidity. At this time, a young dog was given him as a companion, of which he became dotingly fond. After three years' absence, his master again returned; and, in most dogs, all remembrance of him would have been lost, after so long a separation. He again visited the menagerie, to see the animal. It was evening when he reached it, and all was shut up. He spoke through the shutters, and the instant the wolf heard the voice of his master, he intimated his recognition of it, by long and repeated howling, indicative of his desire to be released. The door to his cell being opened, the wolf sprang out, leaped with his fore-paws upon his master's shoulders, licked his face tion. As the hounds were at hand, the felon bounded away through bush and brake, distancing his pursuers in the first instance, and holding out the promise of an excellent day's sport. These exertions, however, were too violent to be long continued; and the hunters knew, from the increased yelling of the pack, that it was gaining upon the enemy every moment. At this juncture, a gentleman who rode foremost in the chase, observed the animal pause, look round, and then bound away apparently with fresh vigour, and greatly increased speed. Attracted by this circumstance, he rode up to the spot, and there found a very young cub, which the affectionate mother had carried at least two miles in her teeth, and which she did not abandon till the very last extremity! Situated as they were, the party had no means of restoring the cub; but, as a reward for the fidelity of the mother, the whipper-in was immediately ordered to call off the dogs, and recommence the sports of the day in a totally different quarter.

LATE LXXXI.—ORNITHOLOGY.

Order GALLINAE. Genus MELEAGRIS. Genus PENELOPE, and genus CRAX.

FIG. 1. *American Wild Turkey. Meleagris Gallipavo*, LINN. and CUV.

The American, or original turkey, is about three feet and a half in length; being somewhat larger than the domestic variety: it has a bare, red, carunculated head and neck: a dilatable fleshy appendage hangs over the beak: the prevailing colour of its plumage is a splendid black, inclining to brilliant gilded copper-colour, in some lights; in others, it inclines to purple: the greater wing-coverts are glossy brown: quills green-gold, black towards the ends, and white at the tips: the breast has a tuft of black hairs, about eight inches in length: the tail consists of eighteen feathers, which are brown varied with black, of which latter colour the tips are; its coverts are waved with black and white: the legs have a short blunt spur: the female is destitute of the tuft on the breast, at least none but old ones possess it, and then it is not above half the length of that of the male: the legs have not a spur. The young males do not put out the tuft on the breast till they are about three years old.

In a domestic state turkeys vary exceedingly; but the most common appearance is dark gray, inclining to black, a barred dusky white, and black: it also occurs entirely of a fine deep copper-colour, with the greater quills pure white, and the tail of a dirty white, and is an elegant variety.

White turkeys are not uncommon, often having their entire plumage of that colour: they also occur with their head crested.

There can be no doubt the turkey originally came from North America, where they still associate in flocks, consisting of upwards of five hundred: they frequent the great swamps to roost; but at sunrise they leave, and retire to the woods in search of acorns and berries: they perch on trees, and attain the height they wish by rising from bough to bough; and generally contrive to reach the summits of the loftiest trees by that means. They run with rapidity, but fly very awkwardly, and towards the spring they become so fat that they cannot fly above three or four hundred yards, and are then easily run down by a horseman: the hunting of them forms a principal amusement in Canada: when a herd is discovered, a well-trained dog is sent into the midst of them: the birds no sooner perceive him than they run off at full speed, and with such swiftness, that they leave the dog far behind: he still follows, and as they cannot go at this rate for any length of time, at last forces them to take shelter in a tree; where they sit, completely fatigued, till the hunters come up, and with long poles knock them down one after another. In the inhabited parts of America, the wild turkeys begin to disappear, and in fact are comparatively rare, being only found in the wildest and most unfrequented spots.

The females lay their eggs in the spring, generally in a retired and obscure place, as the male will often break them. They are usually from fourteen to eighteen in number, white mixed with reddish or yellow freckles:* the female sits with so much perseverance, that if fresh eggs be introduced into the nest immediately upon the young being hatched, she will continue on the nest till they be perfected, and will remain upwards of two months on the nest, if permitted. She is very careful of her young, but gives them very little protection against the attacks of any rapacious animals that come in her way, but rather gives them warning of their danger than attempts to prevent it; and as soon as they are sufficiently strong, she abandons them entirely, and they are then able to endure the utmost rigour of the winter. "I have heard a turkey-hen, (says the Abbé de la Pluche,) when at the head of her brood, send forth the most hideous scream, without my being able to perceive the cause; her young ones, however, immediately when the warning was given, skulked under the bushes, the grass, or whatever else seemed to offer shelter or protection. They even stretched themselves at full length on the ground, and continued lying motionless, as if dead. In the mean time the mother, with her eyes directed upwards, continued her cries and screaming as before. On looking up in the direction in which she seemed to gaze, I discovered a black spot just under the clouds, but was unable at first to determine what it was; however, it soon appeared to be a bird of prey, though at first at too great a distance to be distinguished. I have seen one of these animals continue in this agitated state, and her whole brood pinned down as it were to the ground, for four hours together, whilst their formidable foe has taken his circuits, has mounted, and hovered directly over their heads: at last, upon his disappearing, the parent changed her note, and sent forth another cry, which in an instant gave life to the whole trembling tribe, and they all flocked round her with expressions of pleasure, as if conscious of their happy escape from danger."

The motions of the turkey, when agitated with desire, or inflamed with rage, are very similar to those of the peacock: it erects its tail, and spreads it like a fan, whilst its wings droop and trail on the ground, uttering at the same time a dull hollow sound; it struts round and round with solemn pace, assumes all the dignity of the most majestic of birds, and thus expresses its attachment to its females, or its resentment to those objects which have excited its indignation.

Turkeys are bred in great numbers, and driven to market in flocks of several hundreds. The drivers manage them with great facility, by means of a bit of red rag tied to the end of a long stick, which, from the antipathy these birds bear to that colour, effectually answers the purpose of a scourge.

These birds are kept in a domestic state in most countries.†

FIG. 2. *Guan. Penelope Cristata*, LINN. and CUV.

On account of the great variations of plumage these birds undergo at different periods of their lives, it becomes very difficult to separate the species with accuracy: they build on trees, and feed on fruits and seeds. All the species have a very similar cry, like the words *jacu*, *yacou*, *yacuhu*, or *jacuhu*: which names the Indians have applied to several of the species from that circumstance.

FIGS. 3 and 4. *Curassow. Corax Alector*, LINN. and CUV. *Male and female.*

Length near three feet: the irides dull black-brown: the eye is placed in a naked space, of a yellow colour, varied with

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* According to Audubon, several hens sometimes associate and rear their broods together. He once found three sitting on forty-two eggs.

† The weight of a wild turkey-hen, according to Audubon, averages about nine pounds.

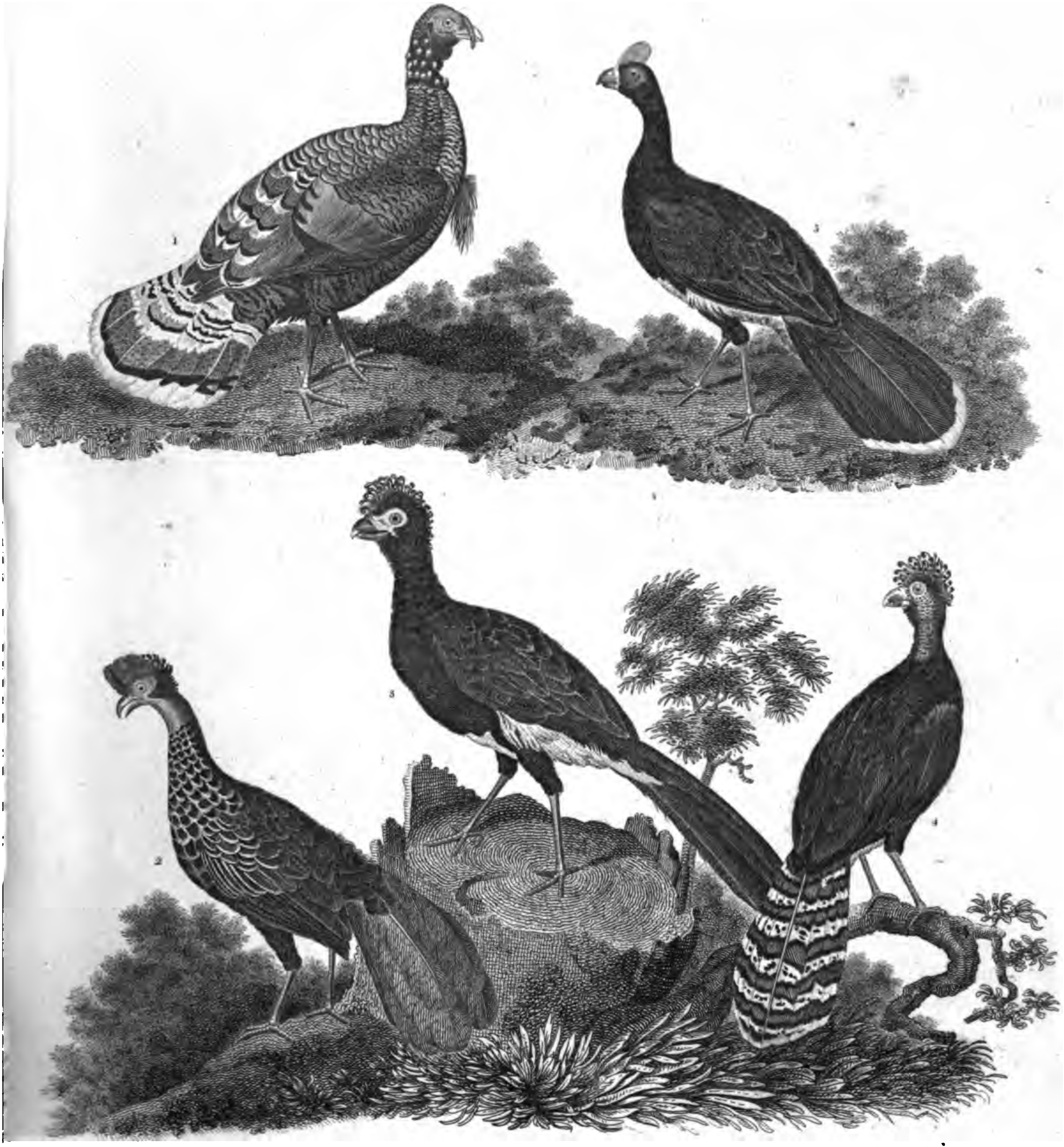
Linn. Syſt.

ORNITHOLOGY

Div.ⁿ 2ᵈ *Land Birds* — Order 5th GALLINÆ

PLATE .81.

of Order G.ᵃᵉ



GENUS *MELEAGRIS* (Turkey.
1. M. *Gallipavo.*
AMERICAN WILD TURKEY

G. *PENELOPE* (Guan)
2. P. *Cristata.*
GUAN

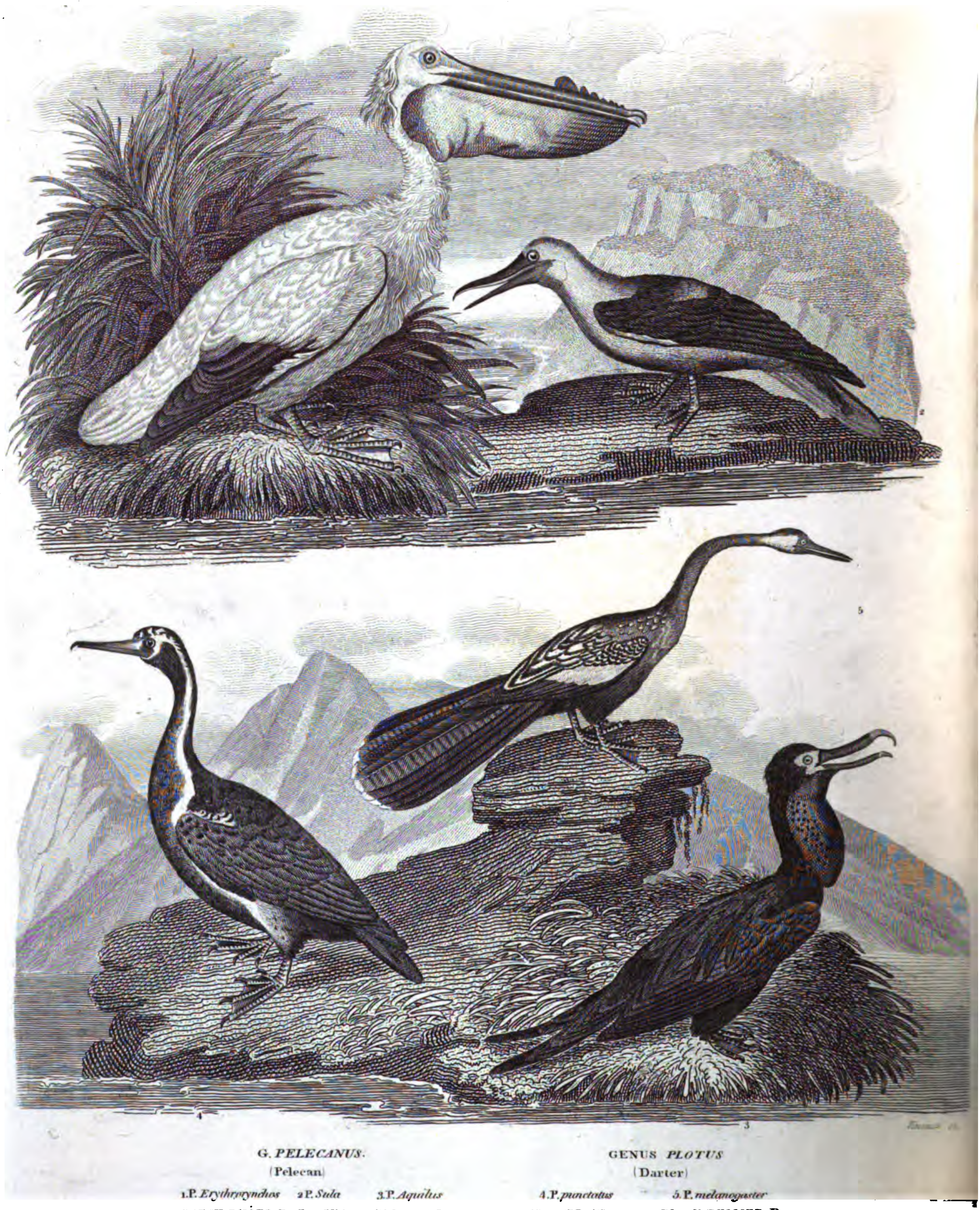
G. *CRAX* (Curassow)
3. C. *Alector.* 5. C. *Pauxi.*
CURASSOW, Male. 4 Female. *CUSHEW.*

Linn. Syſt.

ORNITHOLOGY.

PLATE. 82.

Div^{n} 2^{d} Water Birds. — Order 3^{d} ANSERES.



G. PELECANUS.
(Pelecan)

GENUS PLOTUS
(Darter)

1. P. *Erythrorynchos*	2 P. *Sula*	3. P. *Aquilus*	4. P. *punctatus*	5. P. *melanogaster*
ROUGH BILLED P.	BOOBY P.	FRIGATE P.	SPOTTED SHAG.	BLACK BELLIED. D.

black, and reaching to the base of the beak, which it covers to the middle, as a kind of cere or skin: the crest, which it can elevate or depress at pleasure, varies in height according to the age of the bird; in the adult it is composed of twisted black feathers, narrow at their base and broad at the tip: the whole of the upper part of the plumage, the neck, the breast, and the tail, are black, with green reflections; the last, however, is tipped with white; though in some few individuals it is entirely black: the abdomen and the inferior tail-coverts are invariably white: the females resemble the male, but when young have a smaller crest, and their colours are more dull: their beak is gray, and the feathers on the breast are slightly tipped with a gray line; in which latter circumstance they somewhat resemble young males.

Before the first moult, the young measure about two feet in length: the feathers of the crest are straight: the under mandible of the beak, and the tip of the upper, are of whitish horn-colour: the sides of the head and base of the beak naked: the crest streaked alternately with black and white: the neck and the breast are dull black: the whole of the upper parts of the plumage, the secondary wing-feathers, the quills, and the feathers of the tail, varied with broad bands of reddish white; those on the top of the back being narrowest: the breast, the belly, and the thighs are of a deep red, with distant black stripes: the abdomen and the under tail-coverts are bright red, and the feet are reddish gray: as the bird advances in age, the transverse white bands disappear, and by the completion of the second moult they are entirely obliterated, and the belly, the abdomen, and the under tail-coverts become of a pure white, and the crest loses the whole of the white with which it was varied.

Like many other gallinaceous birds, this will mix with other species, and produce singular hybrids, particularly with C. rubra, as there mentioned. A curious variety, a hybrid, is described by Temminck: it has the beak horn-coloured: the temples naked: the feathers of the crest of a pure white at their base, and black at their tips: the head, the neck, the breast, and the upper part of the back, are of a dull black: the shoulders, the wings, the quills, and the upper tail-coverts are alternately barred with black and reddish white: the tail-feathers are black, with distant yellowish white bands, the whole being tipped with this colour: the whole of the under parts, from the breast to the under tail-coverts, are of a reddish yellow, without spots.

These beautiful birds inhabit Guiana, Mexico, Brazil, and Paraguay: they are easily tamed, and will readily associate with other fowls: they are tolerably plentiful, and make a considerable part of the food of the planters, their flesh being excellent, and the Indian hunters take them in great quantities, as they are so tame that they will scarcely fly away when several of the flock are shot, the noise of the gun not in the least alarming them: they associate in flocks of about a dozen, and roost on high trees during the night: their food consists entirely of maize, rice, bananas, and other sorts of fruits: the egg is about the size of that of the turkey; it is of a pure white, like that of the common poultry.

Fig. 5. *Galeated Curassow. Crax Pauxi*, Linn. *Ourax Pauxi*, Cuv.

Length two feet and a half: beak with a horny tubercle at its base, with grooves on the outside, and the inside composed of cells: in the young this is round, but in the old birds it becomes pyriform, and measures two inches and a half in height: its colour is livid blue: the beak is blood-red: the whole of the feathers of the head and neck are short and velvety: the rest of the plumage, with the exception of the abdomen, is black, with green reflections, each feather being terminated by a circle of dull black: the tail-feathers are black, tipped with white: the abdomen and the under tail-coverts are of pure white: the feet are red: the claws yellow: the irides brown. The female resembles the male; but the young are brown and red, and they do not possess the corneous tubercle on the beak till after their first moult.

This inhabits Mexico, Curassaw, and other parts of the middle region of America; it is said by Fernandez to build on the ground, like the pheasant. The young feed on insects, and as they grow up they devour fruits, grains, and other substances, like the rest of this group: the female lays several eggs, the size of those of the turkey.

PLATE LXXXII.—ORNITHOLOGY.

Order Anseres. Genus Pelecanus.

Fig. 1. *Rough-billed Pelican. Pelecanus Erythorynchus*, Linn. and Cuv.

This curious species is thus commemorated by Dr. Latham, in his History:—"Size between a goose and a swan: length four feet six inches: beak thirteen inches, shaped as in other pelicans, with the addition of some singular protuberances on the top of the upper mandible, from the base of which, for about seven inches, the surface is plain; at this part an elevated ridge begins, about one inch and a half in height, and one-third of an inch in thickness; this continues about an inch and a half on the beak, and then other smaller ones take rise, of different sizes, and continue decreasing in size in an abrupt manner to the end of the beak: the colour of both reddish-yellow, here and there inclining to red; the under mandible and pouch as in other species, but on each side about the middle of the first, is a black spot, the size of a silver penny; and the bag is streaked with fine lines of black, which are pretty numerous on the fore part of it, most so next the end of the beak: the plumage is wholly of a pure white, except the bastard wings and quills, which are black: the shafts of the larger ones white; at the hind-head the feathers are greatly elongated, forming a crest of four inches and a half in length: the legs are black." Found in America.

Fig. 2. *Booby Pelican. Pelecanus Sula*, Linn. *Sula fusca*, Cuv.

Length two feet six inches: the beak nearly four inches and a half long, denticulated on its edges; it is gray, with a pale brown base: naked space round the eyes, and on the chin of a yellowish colour: irides pale gray: the head, neck, upper parts of the body, wings, and tail ashy-brown; the greater quills darkest: the tip of the tail brownish: the breast, belly, thighs, and vent white: the legs pale yellow: the claws gray. The young have the head and neck white, slightly tinged with brown.

Common on the coasts of the warmer parts of America, particularly in the Bahama Islands, and off the Brazilian coast. They are described as being very silly, stupid birds, from thence their name: they build their nests on the ground occasionally, but prefer constructing them on trees: their flesh is very dark-coloured, rank, and disagreeable, though frequently eaten by mariners.

Fig. 3. *Frigate Pelican. Pelecanus Aquilus*, Linn. *Tachypetes Aquilus*, Cuv.

The usual length of this bird is three feet, from the tip of the beak to that of the tail: the prevailing colour of the plumage of the male is black, glossed with green on the back; of the female dusky, with the abdomen and nearly the whole of the head white: the eye, and parts immediately surrounding it, are black: the beak is of a dirty yellowish white: the feet of the male are black; those of the female of a bluish-white: the male is also distinguished from the female by a large fleshy bag, or sac placed under the throat, of a bright red colour, and in its flaccid state putting on a granulated appearance: when distended it is smooth, and enlarges to the size of a hen's egg.

A very interesting account of this singular bird is given by Mr. Burton, in the thirteenth volume of the Linnean Transactions. It resides in abundance in the Island of Ascension, and is also found on many of the coasts of the islands and continents of the south: its food consists chiefly of fish, and generally of the *Exocetus volitans:* the female lays one egg of a white colour, nearly resembling that of a hen, though somewhat larger; the male assists in incubation, while the female is employed in procuring food.

Fig. 4. *Spotted Shag. Plotus punctatus*, Linn. *Phalacrocoran punctatus*, Cuv.

A singular species, thus described by Latham (who also figures it.) "Size of the shag (*Ph. Graculus:*) length two feet or more: beak three inches long, of a pale bluish-lead colour; in some yellow; the tip hooked: round the eyes bare, and of a dusky red: the chin, throat, and fore part of the neck are nearly black; as are the forehead, hind part of the neck, and beginning of the beak: just over the forehead arise some long feathers, forming a pointed crest: and at the hind part of the head a second, not unlike the first, but rather longer, some of the feathers measuring an inch and a half: just over the eye begins a line of white, which passes down on each side of the neck quite to the wings, and growing broader as it proceeds downward: the middle of the back and the wings are of a brownish-ash colour, each feather tipped at the end with a round spot of black, largest on the wing-coverts, but nowhere bigger than a small pea: quills not spotted: from the middle of the back to the end of the tail, and from between the legs to the vent, black, glossed with green: tail three inches in length, rounded at the end; that and the quills plain black: legs deep brown, or black." He adds, "In some specimens the beak is reddish, and the legs dull yellow: the chin white, covered with feathers, and destitute of crest: the feathers of the sides near the vent streaked with white: thighs black: the stripe on each side of the neck not so distinct; and the black on the neck less pure. I have likewise observed one with the white on the sides of the neck not passing above half the length of it." Inhabits New Zealand, and builds amongst the rocks.

Fig. 5. *Black-bellied Darter. Plotus Melanogaster*, Linn. and Cuv.

This appears to be a variable species: one described by Latham, from a specimen in the British Museum, measured "three feet three inches and a half in length: its beak four inches and a half; colour dusky yellow, covered at the base with a skin of the same colour, which occupies the space between the beak and eye, and surrounds the latter: nostrils a slit placed obliquely, not far from the base; the upper mandible finely serrated: the head is small, and the neck long and slender, both covered with short downy feathers, of a dusky white: or very pale brown, palest before, and darkest at the lower part behind: the back, scapulars, and wing-coverts are of the same colour, but deeper: the lower part of the neck, on the sides, and the wing-coverts, marked with oval spots of white, regular, and forming rows on the latter: the scapulars streaked longitudinally with white, giving the bird an elegant appearance: across the lower part of the breast a dull rufous bar; from thence all beneath is black, of which colour are also the quills and tail; the last is eleven inches in length, a little rounded in shape, and the ends of the feathers rusty pale brown; the two middle feathers undulated cross-ways in a singular manner: the legs are clumsy, stout, and only four inches and a half in length; the colour dirty yellowish-brown." Native place unknown.

A variety from Cayenne is figured by Buffon; of the length of the former: beak pale yellow: round the eye and throat pale dusky white: the wing-coverts yellowish-white: the rest of the plumage black, except the feathers on the upper part of the back, and some of the scapulars, which are streaked down the middle with white; and the tip of the tail dirty rufous: legs brownish-yellow.

PLATE LXXXIII.—AMPHIBIA.

Genus Crotalus. *Rattlesnake.*

Fig. 1. *Banded Rattlesnake. Crotalus Horridus*, Linn. and Cuv.

Fig. 2. *Striped Rattlesnake. Crotalus Durissus*, Linn. and Cuv.

A genus of American serpents, celebrated for the danger which accompanies their bite, and for the peculiar appendages to their tail. The head is broad, triangular, and generally flat in its entire extent. The eyes are very brilliant, and provided with a nictitating membrane; the mouth very large, the tongue forked at its extremity. The body is robust, elongated, cylindrical, covered above with carinated scales. The tail is short, cylindrical, and somewhat thick. The number of the little bells which terminate it, increases with age, an additional one being formed at every casting of the skin. These bells are truncated, quadrangular pyramids, received within each other in such a manner that only a third part of each is visible, the tip of every bone running within two of the bones below it. Thus they are united by a kind of ball and socket joint, and move with a rattling sound whenever the animal agitates its tail. The noise resembles that made by rumpled parchment, or by two quills of a goose rubbed smartly against each other. The poison fangs are traversed by a canal for the emission of the poison. These fangs, when not used, remain concealed in a fold of the gum; when the animal bites, the fangs are raised. They are two in number, one at each end of the upper jaw. The *crotali* have a fœtid odour; hogs feed upon them, but most animals, especially horses and dogs, dread them. Their principal food is birds and squirrels. They also devour rats, hares, and small reptiles. Their glance has been said to have the power of fascinating their prey so as to make it drop into their mouths; it is probable, however, that they only seize it during the terror and confusion which the sight of them occasions. They creep slowly, and do not bite but when provoked, or for the purpose of destroying their prey; and they sound their rattles some time before attacking their assailants. When seized by the head, they cannot, like other reptiles, raise their tails and twist themselves round the arm, nor make use of their strength to disengage themselves. They usually rest twisted in a spiral form in the customary paths of wild animals, particularly in those which conduct to the water. The remedies employed against the bite of the rattlesnake, are suction and ligatures, caustics and internal medicines. All the species of *crotali* whose country is well known, are confined to America; and the individuals of this genus have diminished in proportion to the increase of population.

PLATE LXXXIV.—ICHTHYOLOGY.

Six of the species here figured, belong to the genus Labrus of Linneus, which is extremely numerous, and embraces many species of peculiar beauty and variety, both in form and colour. Linneus describes their generic characters as follows:

Teeth acute; gill membrane with six rays, and the covers scaly; and the dorsal fin with a filiform skin extending beyond the end of the posterior rays.

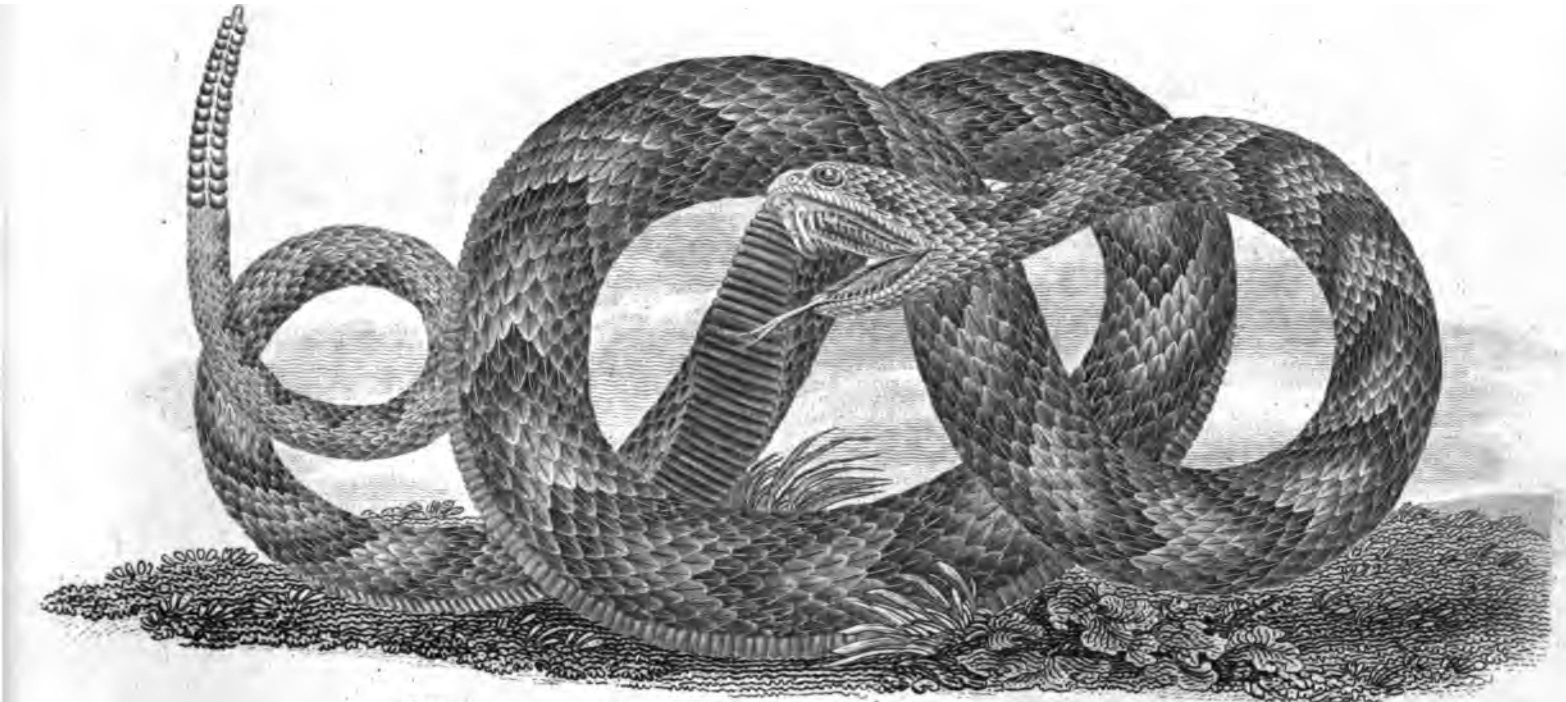
But Lacepede, Cuvier, and others, have greatly subdivided this genus, as the following explanations will, in part, illustrate:

Linn. Syſt.

AMPHIBIA.

GENUS *CROTALUS*.

PLATE. 83.



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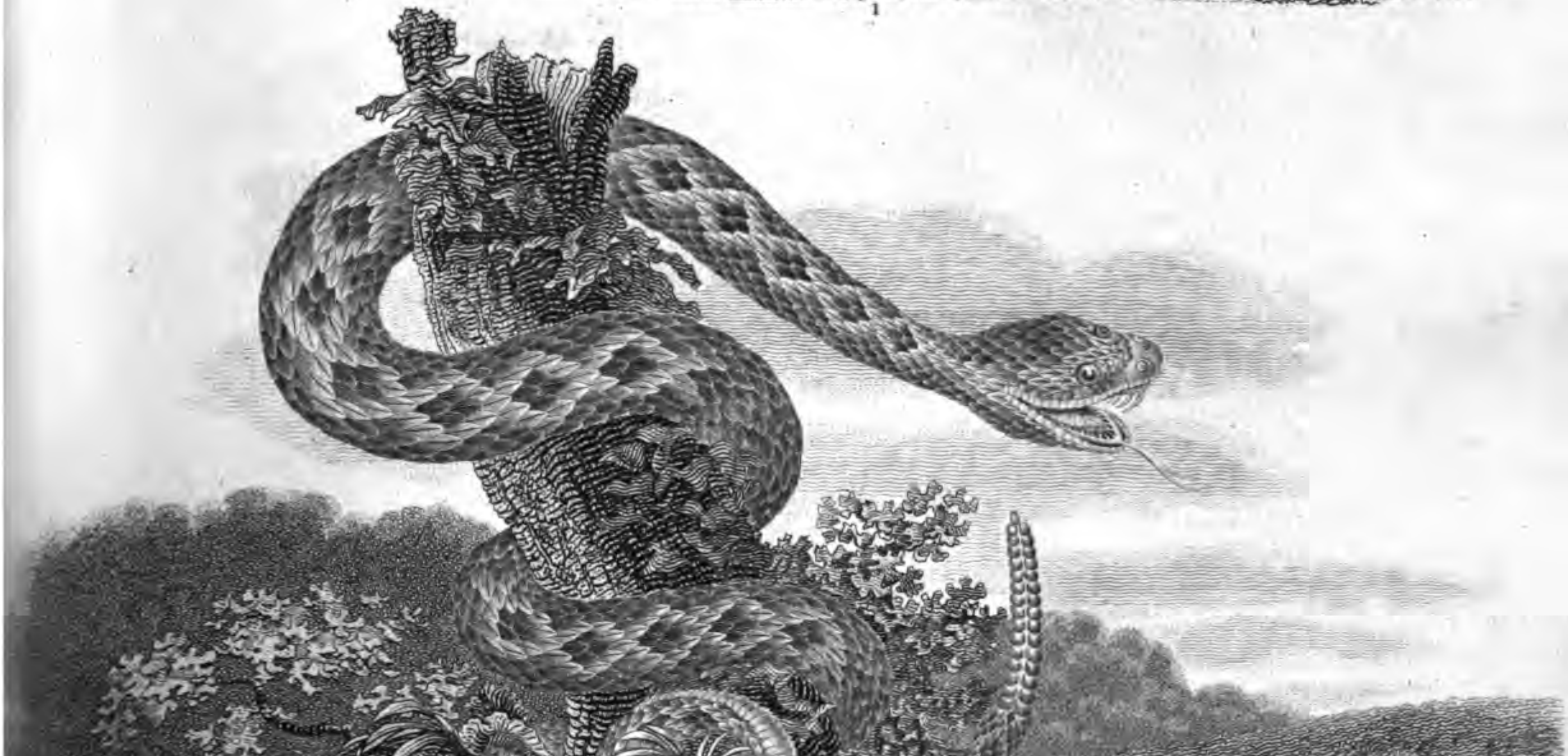


2

J Boyd Sculpt

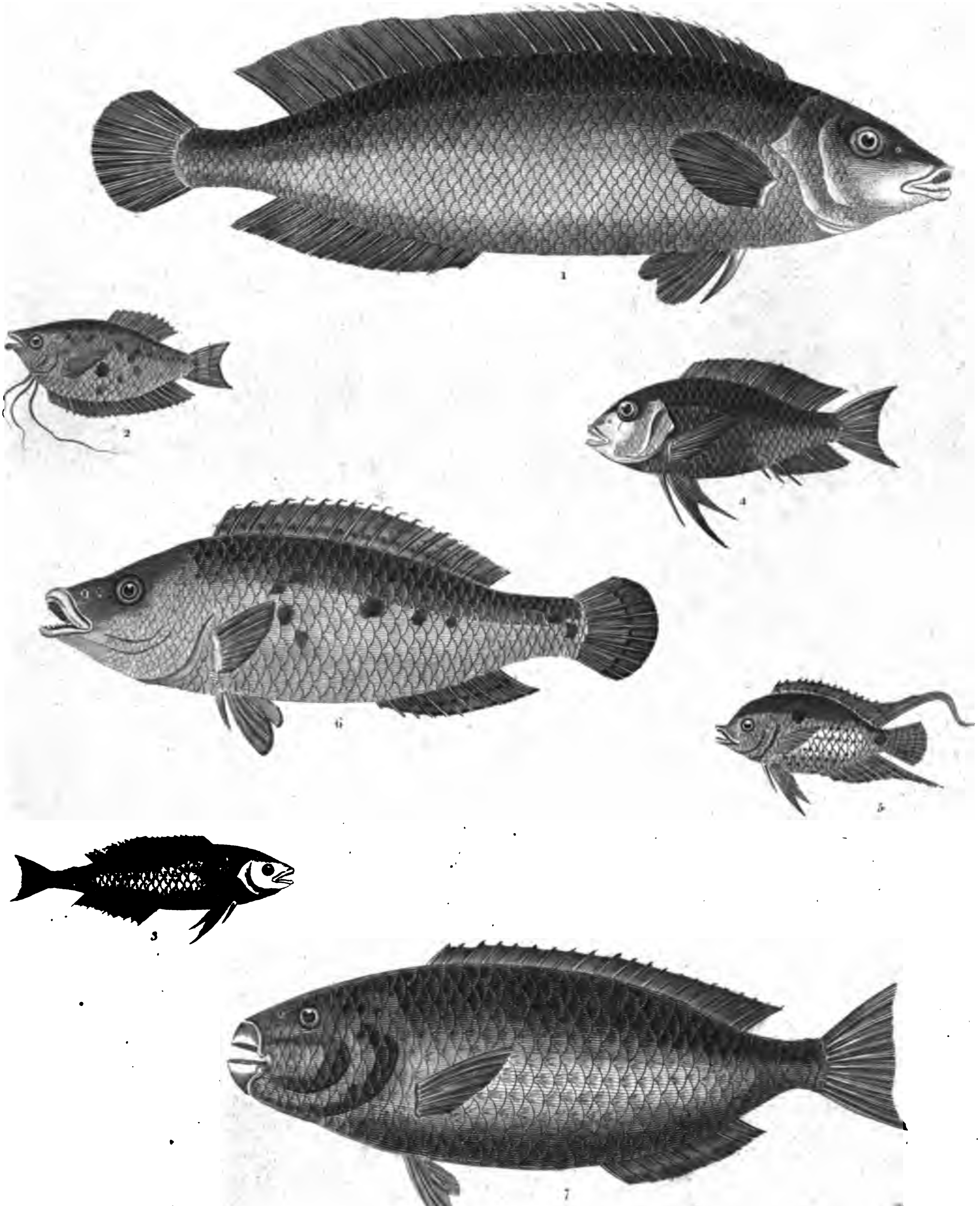
(Rattle Snake)

1.C.*Horridus*
BANDED R.S.

2.C.*Durissus*.
STRIPED R.S.

ICHTHYOLOGY.

ORDER THORACICI.

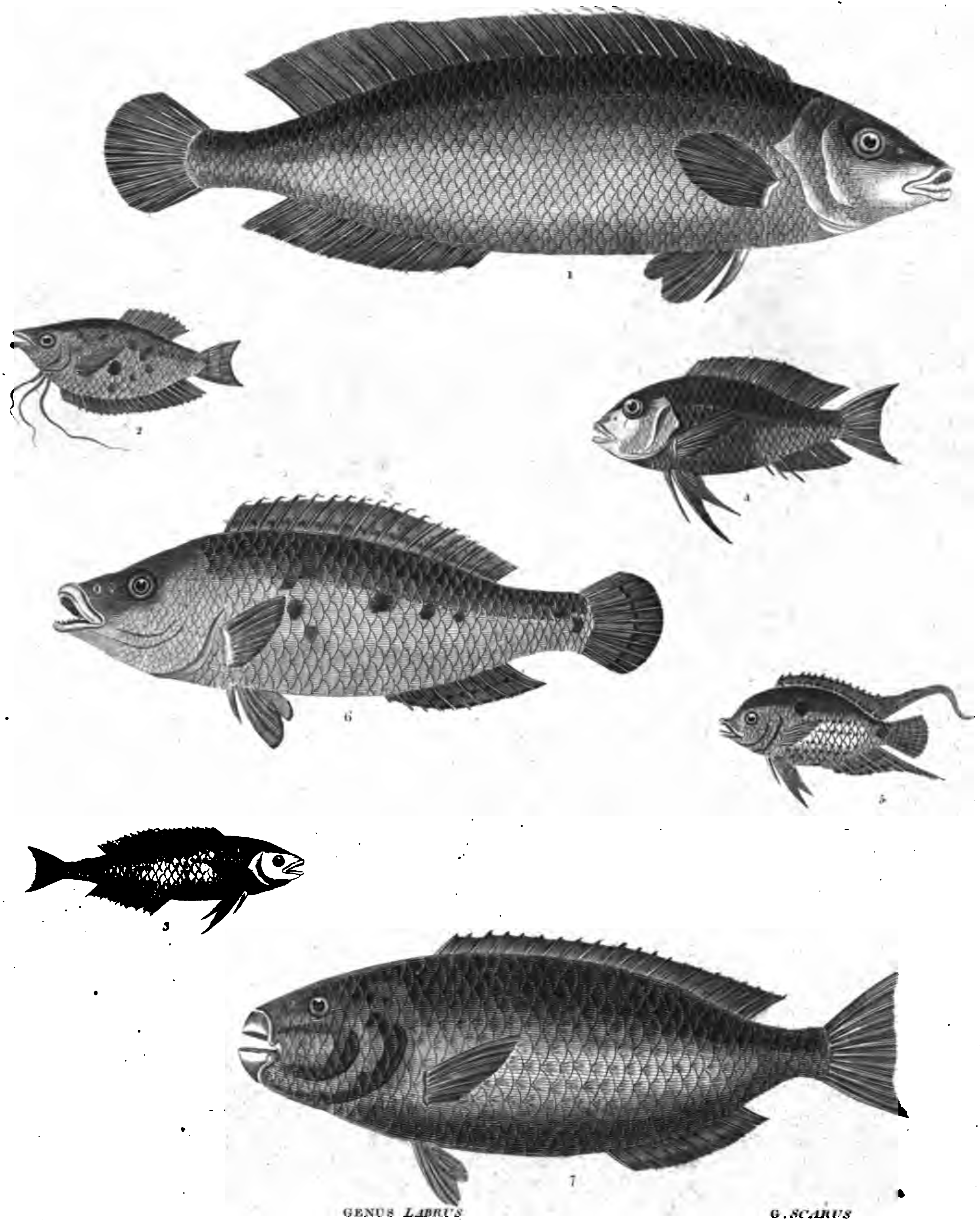


GENUS *LABRUS* G. *SCARUS*

1 L. *microlepidotus* — 2 L. *trichopterus* — 3 L. *malapterus* — 4 L. *maculatus* — 5 L. *punctatus* — 6 L. *melagaster* — 7 S. *viridis*

ICHTHYOLOGY.

ORDER THORACICI.



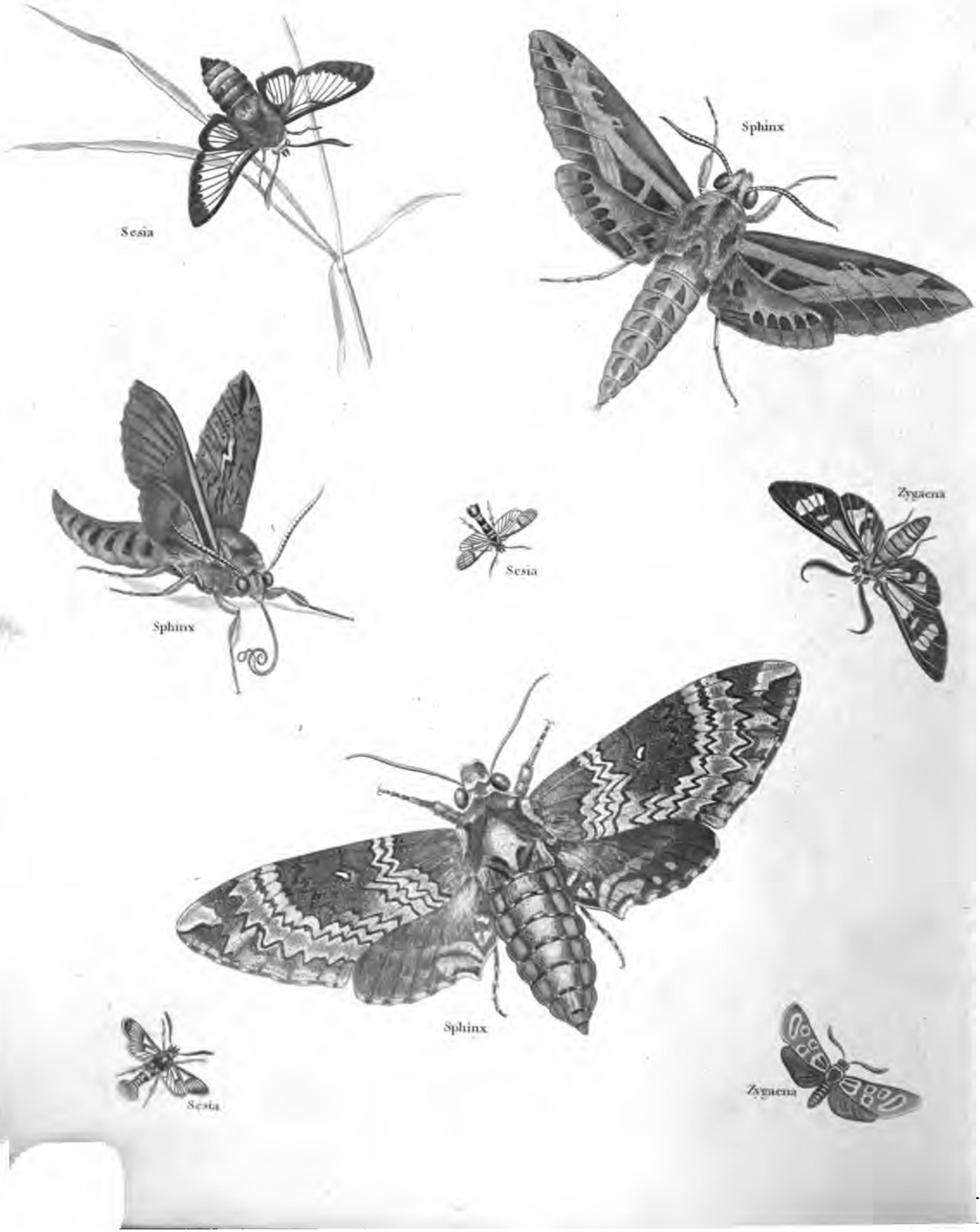
GENUS *LABRUS* G. *SCARUS*

1.L. *microlepidotus* — 2.L. *trichopterus* — 3.L. *malapterus* — 4.L. *maculatus* — 5.L. *punctatus* — 6.L. *melagaster* —— 7.S. *viridis*

ENTOMOLOGY.

Linn. Syst. *Order* Lepidoptera *PLATE. 86.*

Genus SPHINX.

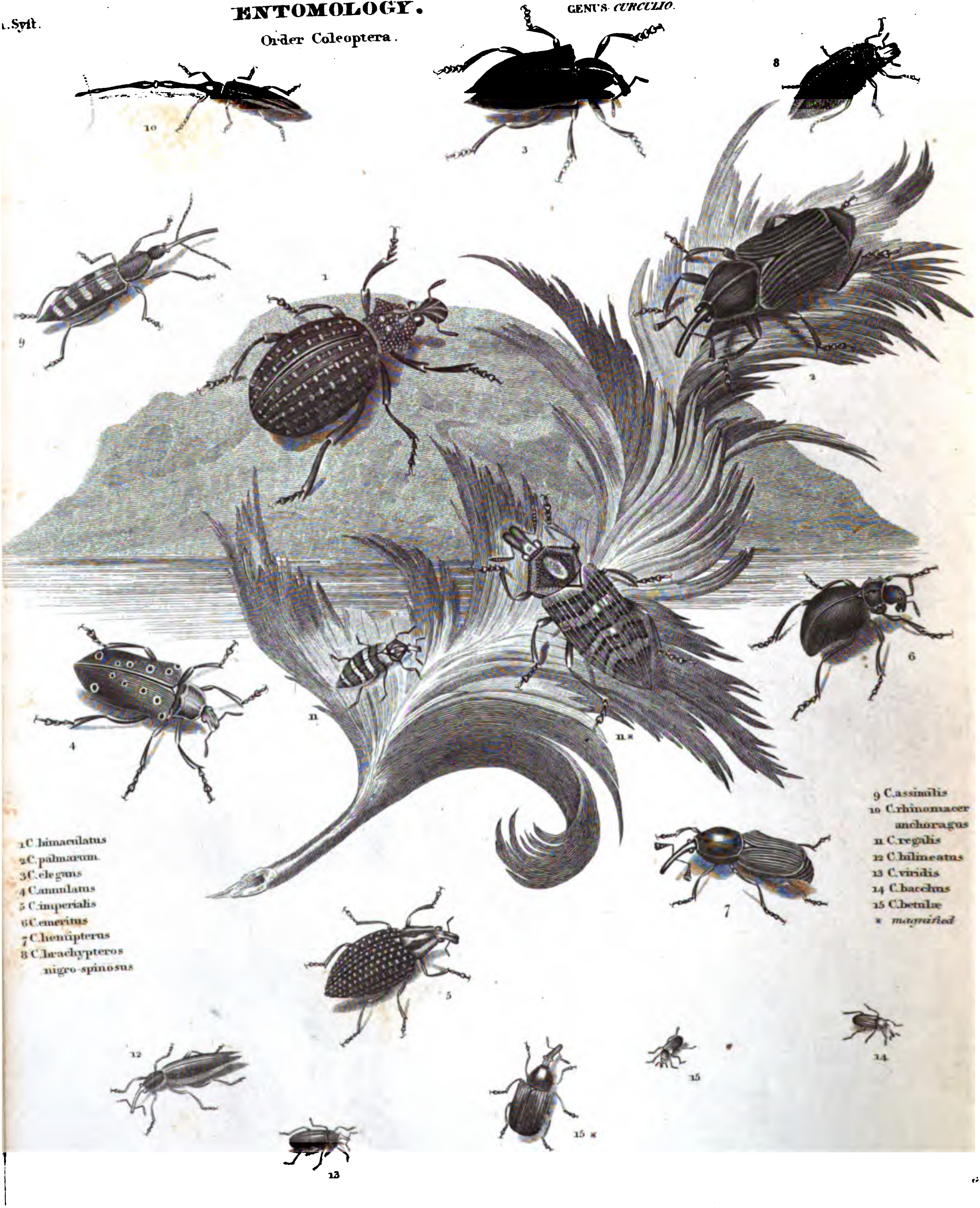


ı.Syſt.

ENTOMOLOGY.

Order Coleoptera.

GENUS CURCULIO.



1 C.bimaculatus
2 C.palmarum.
3 C.elegans
4 C.annulatus
5 C.imperialis
6 C.emeritus
7 C.hemipterus
8 C.brachypteros
nigro-spinosus

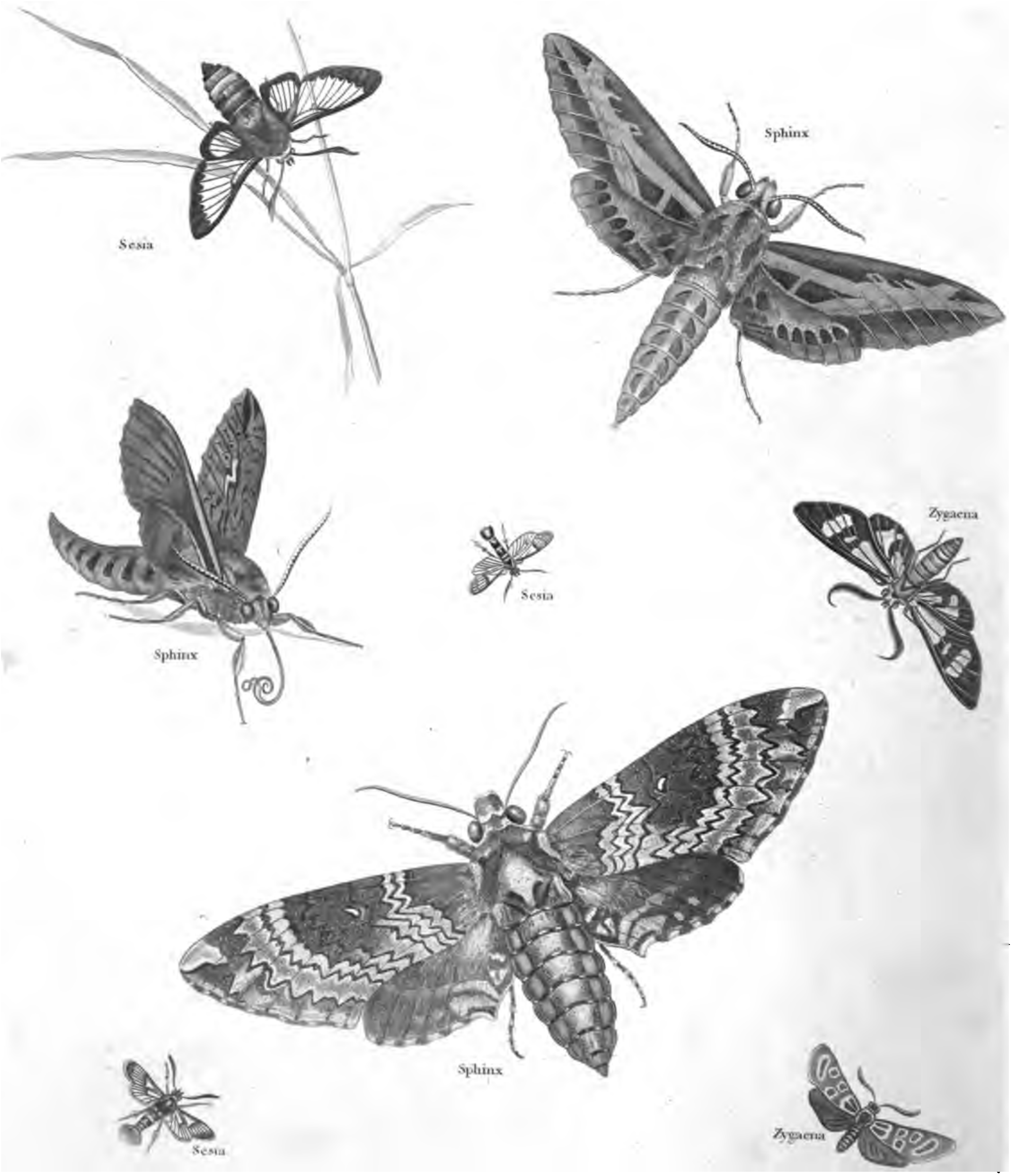
9 C.assimilis
10 C.rhinomacer
anchoragus
11 C.regalis
12 C.bilineatus
13 C.viridis
14 C.bacchus
15 C.betulæ
* *magnified*

G.Murr

ENTOMOLOGY.

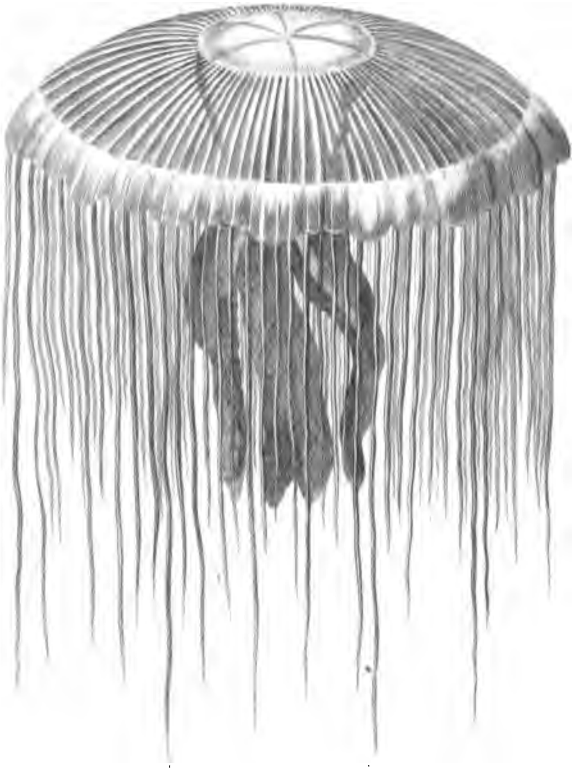
Linn. Syst. *Order* Lepidoptera *PLATE. 86.*

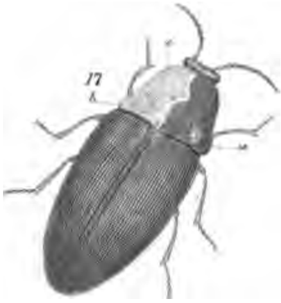
Genus SPHINX.

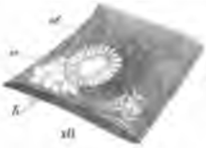


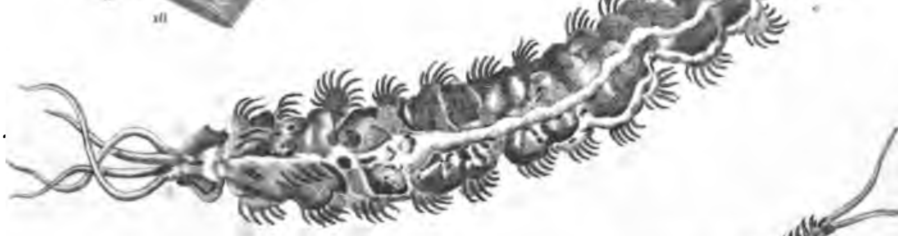
LIGHT.

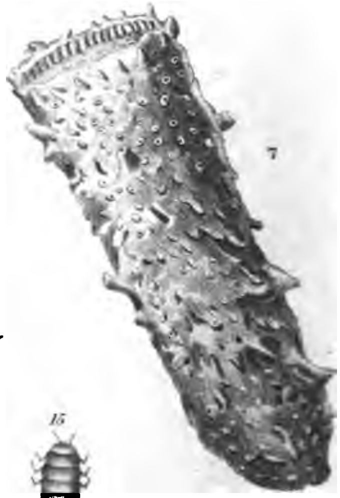
LUMINOUS ANIMALS. PLATE 87

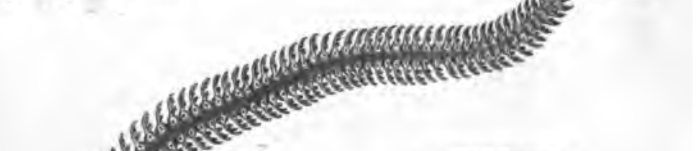


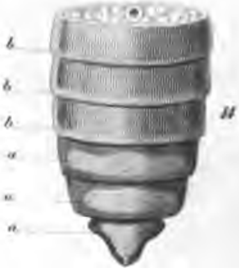












C. G. Cobb Sc.

Fig. 1. *Labrus microlepidotus*, Linn. *Julis microlepidotus*, Cuv.

It is of a yellow colour, with large scales, and nine spines on the dorsal fin. Inhabits the Indian seas.

Fig. 2. *Labrus tricopterus*, Linn. *Trichopoda tricoptera*, Cuv.

Body slightly undulated with brown and pale; the middle of the sides and base of the tail with a brown spot. Inhabits India.

Fig. 3. *Labrus malapterus*, Linn. *Julis malapterus*, Cuv.

Fins black, head free from scales. Inhabits the seas of Japan.

Fig. 4. *Labrus maculatus*, Linn.

Fig. 5. *Labrus punctatus*, Linn. *Chromis punctatus*, Cuv.

Dorsal fin filamentous: body with longitudinal lines spotted with brown. Inhabits Surinam.

Fig. 6. *Labrus melagaster*, Linn. *Cheilinus melagaster*, Cuv.

The genus Scarus, as restricted by Cuvier, has the following characters: the jaws are convex, rounded, and furnished with teeth arrayed like scales upon their edge and upon their anterior surface: these teeth succeed each other from behind forwards, so that those of the base are the newest.

Fig. 7. *Scarus viridis*, Linn. Cuv.

This species, as its name denotes, is of a green colour, but the lateral line is interrupted. It is found in the seas of Japan, and is about the size of a carp.

PLATE LXXXV.—ENTOMOLOGY.

The characters of the insect order Coleoptera, were detailed on a former occasion, (page 57,) and the annexed plate represents fourteen additional species, and a second, and perhaps better view of the well-known diamond-beetle of China.

The specific names of these insects being conspicuously placed at the margin of the plate, there is no occasion to repeat them; excepting a few, which, having been transferred by Latreille to new genera, require a notice of the synonyma; for the Linnean genus Curculio, to which all these insects belong, has been greatly subdivided by later entomologists. Thus—

Curculio bimaculatus, Linn. is *Brachycerus bimaculatus*, Lat.
Curculio palmarum, Linn. is *Calandra palmarum*, Lat.
Curculio hemiptera, Linn. is *Calandra hemiptera*, Lat.
Curculio assimilis, Linn. is *Brentus assimilis*, Lat.
Curculio bacchus, Linn. is *Rhynchites bacchus*, Lat.
Curculio viridis, Linn. is *Chlorima viridis*, Lat.
Curculio anchoragus, Linn. is *Brentus anchoragus*, Lat.

PLATE LXXXVI.—ENTOMOLOGY.

The annexed plate represents eight species of the Linnean genus Sphinx, or Hawk-moth. The species are very numerous, exceeding two hundred. They fly abroad only in the morning and evening, are slow on the wing, and often make a humming noise in their flight. They extract the nectar of plants with their tongue, and some of them attain a great size.

The generic name *Sphinx* is applied, because the larvæ of some species are often seen in an attitude resembling that of the Egyptian sphinx, viz: with the fore-parts elevated, and the other parts applied flat to the surface of the body.

The larva has 16 feet, and is pretty active; that of the zygænæ, a division of this genus, is thick and flat, and covered with short hairs; that of the sesiæ is generally naked, unarmed, and thinner towards the head; others have a sharp, erect, stiff horn behind. They inhabit all countries, but especially the tropical regions.

PLATE LXXXVII.—LUMINOUS ANIMALS.

This singular property of living animals to emit light, appears to be confined to those only of a simple structure, as in certain species of *mollusca*, *insects*, and *zoophytes*.

The connexion between some of these animalculæ and the phosphoresca of the sea has already been examined at some length, (page 16), and it has there been shown that they frequently exist in such innumerable multitudes as amply to account for a phenomenon which some writers have endeavoured to explain by other causes. Thus, Martin attributes the phosphoresca of the sea to putrefaction: Silberschlag believed it to be phosphoric: Professor Mayer supposed the sea to imbibe light, which it afterwards discharged: Bajon and Gentil supposed the light of the sea was electric, and caused by friction.

It is unnecessary to enter into a discussion of the above opinions; for their authors have not supported them by facts or experiments. It is sufficient to say, that they are contradicted by all the best observations on the subject.

The annexed plate gives accurate illustrations of several luminous animals both from the sea and land; and we shall make a few remarks upon each.

Fig. 1. *Nereis noctiluca*, Vanelli.

Natural size. Vanelli discovered this animalcule on the leaves of an alga, taken from the lake of Chioggia. From its extraordinary luminous qualities, he, and many writers after him, referred the phosphorescence of the sea to its agency. Its localities are now, however, believed to be restricted to some places in the Mediterranean; and the surprising phenomenon which was attributed to it, is now known to belong to several other species of animals hereafter mentioned.

Fig. 2. Same, greatly magnified.

Fig. 3. A luminous insect discovered by Riville.

Fig. 4. *Cancer fulgens*, of Sir Joseph Banks. Natural size. This species was discovered by Sir Joseph Banks, between Madeira and Rio Janeiro. He observed its whole body to be illuminated, and to produce, at short intervals, vivid flashes of light.

Fig. 5. *Lemulus noctilucus*. Greatly magnified. Somewhat resembles the common wood-louse, and was found by captain Hersburg emitting a vivid light in the Arabian sea.

Fig. 6. *Medusa pellucens*. Less than the natural size. This marine animalcule throws out flashes of light during its contractions, and so vivid are these appearances, that a bucket of sea-water containing them, has been compared to a stream of fused gold.

Fig. 7. *Pyrosoma Atlanticum*, Peron. This beautiful marine animalcule was discovered in the Atlantic Ocean. The colour of this animal when at rest, is of mixed white and green, but varies with every motion of its body. When beneath the waves, it has been compared to a red-hot bullet; but when floating on the surface, resembles a cylinder of incandescent iron. It need scarcely be added, that where they exist in great numbers, they render the sea astonishingly luminous.

Fig. 8. *Medusa lucida*, Macartney. Natural size. Common in the Atlantic, and in its habits resembles the M. Scintillans.

Fig. 9. *Beroe fulgens*, Macartney. Natural size. When this species approaches the surface of the sea, its whole body becomes slightly luminous; during its contractions, a stronger

light is emitted; and when the water containing many of them is suddenly shaken, flashes of light are thrown out.

FIG. 10. ***Medusa scintillans***, MACARTNEY. Natural size. This is supposed to be one of the commonest of the marine luminous animals. It exists in vast numbers, and diffuses a sparkling light through the sea.

FIG. 11. Same, highly magnified.

FIG. 12. A luminous animalcule.

FIG. 13. Same, highly magnified.

FIG. 14. *Lampyris lucida*, a species of glow-worm. Inferior surface, with the integuments removed—*a*, *a*, *a*, three masses of luminous substance, which are applied to the three last rings of the abdomen; *b*, *b*, *b*, the arrangement of the cellular substance on the other abdominal rings, and which gives the pale colour to the whole belly of the insect. The glow-worms, like the fire-flies, have the power of regulating at pleasure the degree of light they emit.

FIG. 15. Dissections of the common glow-worm, exposing the sacs of luminous matter on the last ring of the abdomen. *a*, the sac on one side.

FIG. 16. One of the sacs of the glow-worm, highly magnified.

FIG. 17. ***Elater noctilucus***, fire-fly of the West Indies, with a portion of the shell of the thorax removed to expose one of the organs of light, of which there are two, one on each side; *a*, the yellow transparent spot of the thorax; *b*, the oval mass of luminous substance; *c*, the ends of the muscles of the inside of the thorax. With respect to this insect, some Spanish writers say, that the time their countrymen invaded South America, many tribes used no other light in transacting their ordinary business; and that the Indian women wore it by night as an ornament to their head-dresses.

FIG. 18. Part of the ***Elater noctilucus***, considerably magnified; *a*, the radiated cellular tissue around the oval luminous mass; *b*, the arrangement of that substance when it passes down between the muscles; *c*, the ends of the muscles of the back; *d*, shell of the thorax.

FIG. 19. ***Elater ignitus***, a species of fire-fly—*a*, the yellow part of the thorax; *b*, the small mass of luminous substance seen on removing the shell of the thorax.

FIG. 20. *Nereis cærulea*.

PLATE LXXXVIII.—CONCHOLOGY.

The annexed plate gives an accurate view of ten species of the genus CYPREA, one of the most numerous and beautifully varied of the shell tribe.

In the cyprea, the spire projects but little, and the aperture is narrow, and extended from one extremity to the other; the shell is greatly inflated in the middle, and the aperture is transversely wrinkled on each side. In the living shell, the mantle is so large as to fold over and envelop the shell, which at a certain age it covers with a layer of another colour, so that this difference, added to the form acquired by the aperture, may easily cause the adult to be mistaken for another species. Nearly all the species of cypræa inhabit the seas of tropical climates.

FIG. 1 and 2. *C. tigris*, LINN. LAM.

Shell ovate, rounded, with deep brown spots, and a yellowish line along the back. It comes from India, and presents many varieties.

FIG. 3 and 4. *C. annulata*, LINN. LAM.

Shell surrounded on the back with a yellow ring. Inhabits the Indian ocean.

FIG. 5. *C. fasceata*, LINN. LAM.

Shell turbinated, with waved brownish bands. Inhabits the seas of India.

FIG. 6. *C. maculata*, LINN. LAM.

With whitish spots on a brownish ground. From India.

FIG. 7. *C. vespa*, LINN. LAM.

A small species, with whitish dorsal spots. Inhabits the Indian seas.

FIG. 8. *C. pediculus*, LINN. LAM.

Shell small, with transverse furrows, some of which are furcated. It inhabits many parts of the Atlantic Ocean.

FIG. 9. *C. aurora*, LINN. LAM.

A large, ventricose shell, of a uniform yellowish red colour. It comes from India, and is much prized by collectors.

FIG. 10. *C. arabica*, LINN. LAM.

General colour whitish, with irregular brown marks, resembling Arabic characters. Inhabits the Indian seas.

FIG. 11. *C. argus*, LINN. LAM.

Shell subcylindrical, sprinkled with ocellated spots: beneath, four brown spots. Found in the Indian ocean.

FIG. 12. *C. moneta*, LINN. LAM.

Shell whitish, with a nodulous margin. Inhabits the African and Indian seas. It is fished up in vast numbers by the negro females of Africa, three days before or after the full moon, and is used by the natives in place of money, by the name of *cowrie*.

PLATE LXXXIX.—THE CRATER OF MOUNT VESUVIUS.

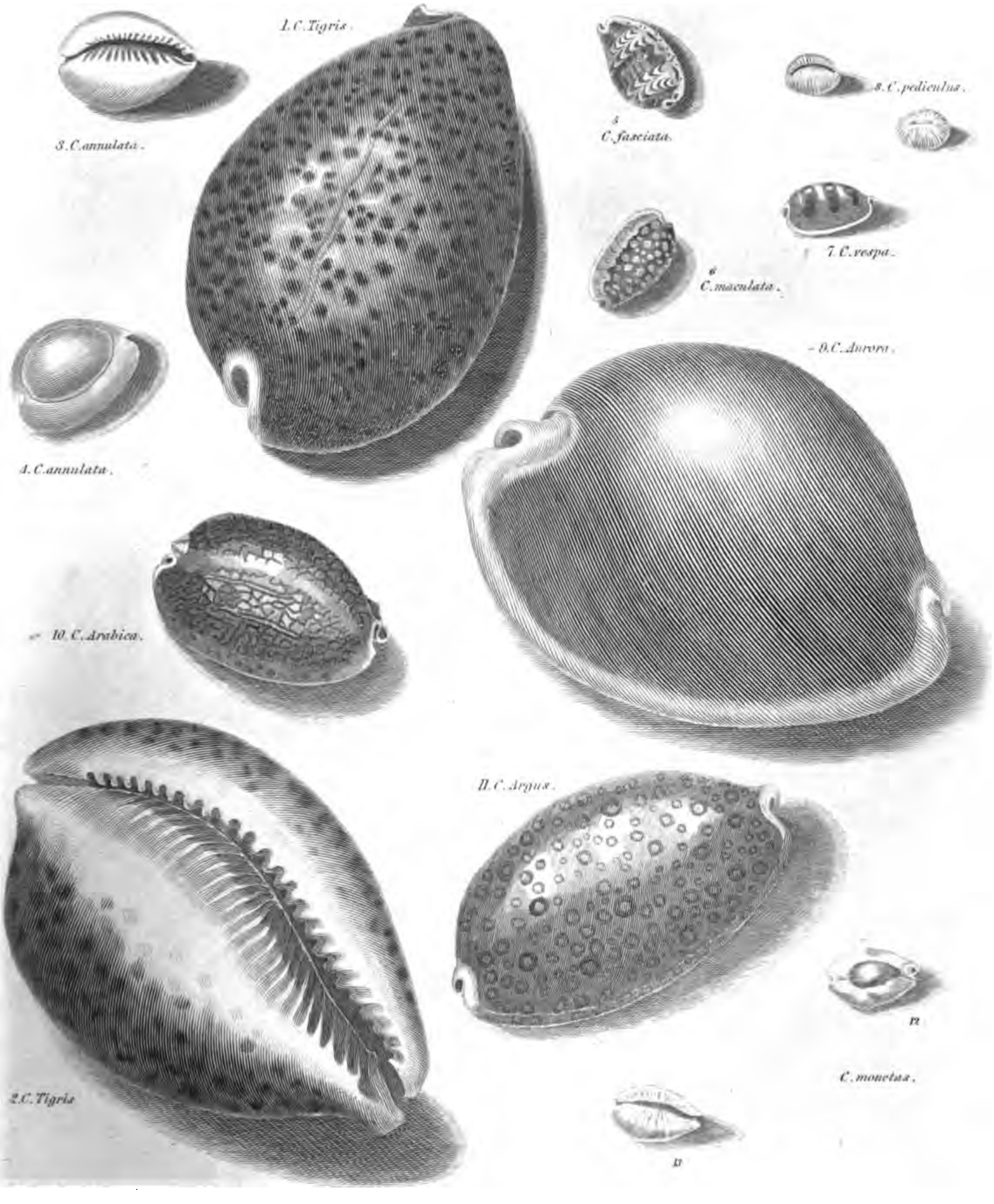
Mount Vesuvius, well known by name to all our readers, is about a mile and a quarter from the city of Naples. It rises in the form of a pyramid out of the plain; previous to the eruption of 1794, it was separated by wide valleys from the mountains of Sommo and Ottojano, but the summit of the mountain then sank, and the valleys were filled up. The height of this mountain is ascertained to be 3,680 feet. Near the summit is a little plain, represented in the plate, in the midst of which is seen the crater perpetually smoking. Its sides are in places quite barren, while in others vines and fruits are met with between streams and fields of burning lava; notwithstanding the frequency of these fiery streams, the base of the mountain is inhabited and cultivated, and fine wine is produced by the tenants. The eruption of 79 buried the cities of Herculaneum and Pompeii, and subsequent ones have heightened the mountain, and given it its sugar-loaf form. In 1776, 1779, and 1794, the large town of Torre del Greco was nearly destroyed, and frequent repetitions, say almost yearly, of frightful eruptions, have occurred since that period. In 1822, the shower of ashes was so great as to darken the light of day in Naples, and they were dispersed as far as Cassano, 105 miles from Vesuvius, while the lava, twelve or thirteen feet in depth, poured down a stream for a mile in length. The sides of the mountain are steep, and its summit difficult of ascent, while the changes effected by the running lava, put travellers to unexpected difficulties and exertion. The gulf of the crater is not more than ninety rods in depth. In 1801, eight Frenchmen descended into the crater, and their example has since been followed by others, without injury. In March, 1828, in 1831, and in 1832, eruptions of some magnitude occurred.

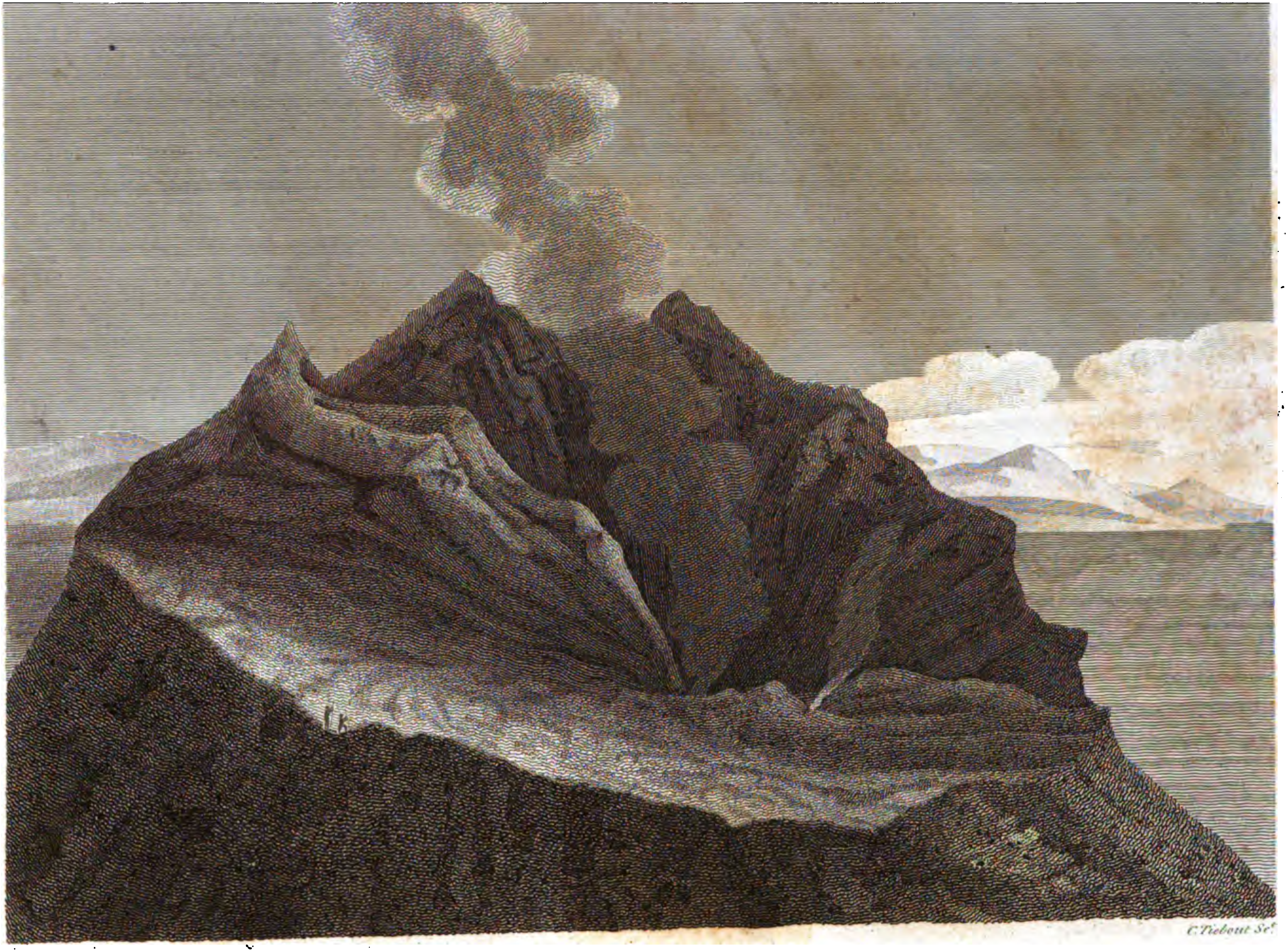
Linn. Syſt.

CONCHOLOGY.

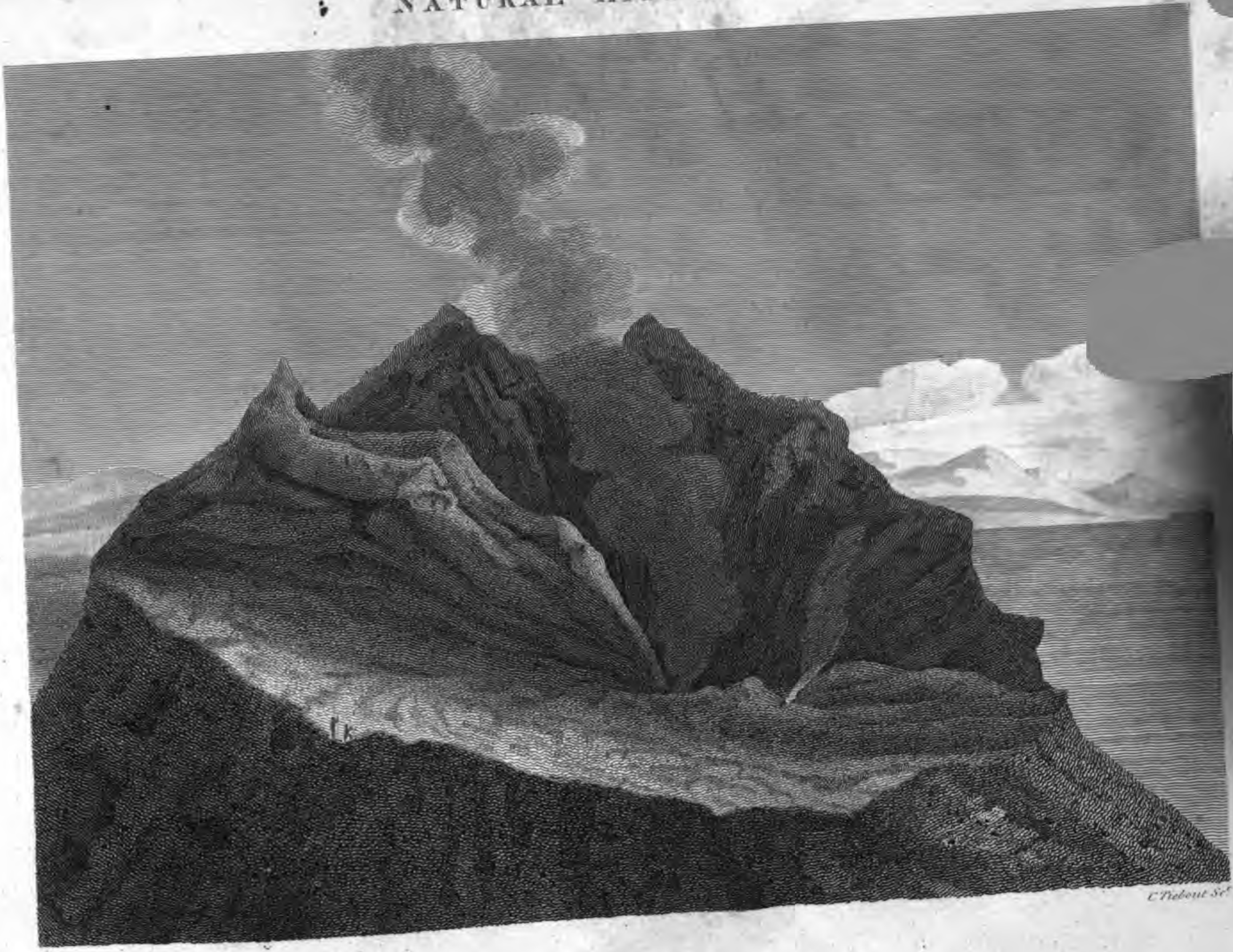
GENUS CYPRÆA.

PLATE 88.


1. C. Tigris.
3. C. annulata.
5 C. fasciata.
8. C. pediculus.
6 C. maculata.
7. C. vespa.
4. C. annulata.
9. C. Aurora.
10. C. Arabica.
11. C. Argus.
2. C. Tigris
12
C. monetaa.
13

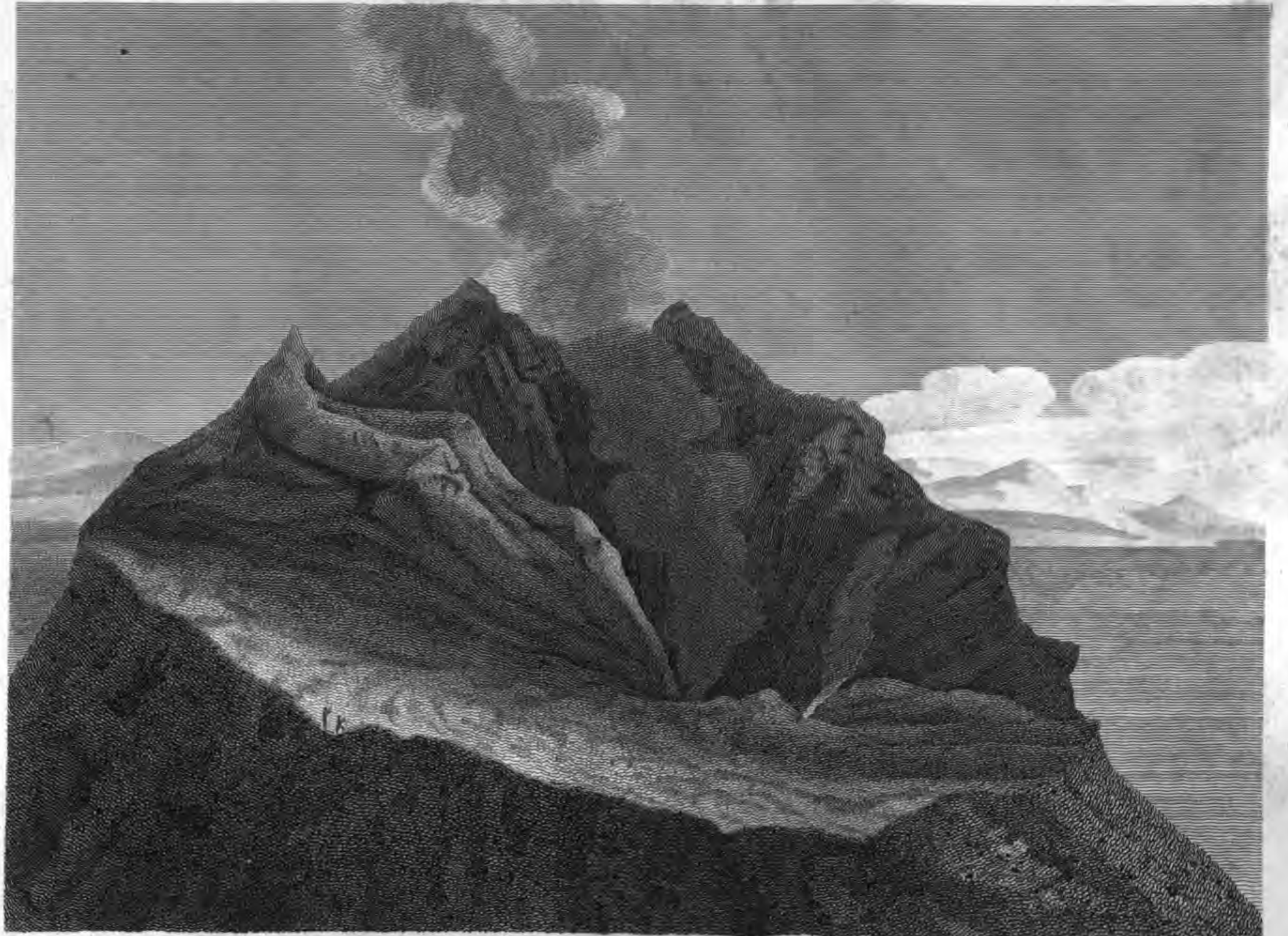

C. Tiebout Sc.

THE CRATER OF MOUNT VESUVIUS.



C. Tiebout Sc.

THE CRATER OF MOUNT VESUVIUS.



C Tiebout Sc.

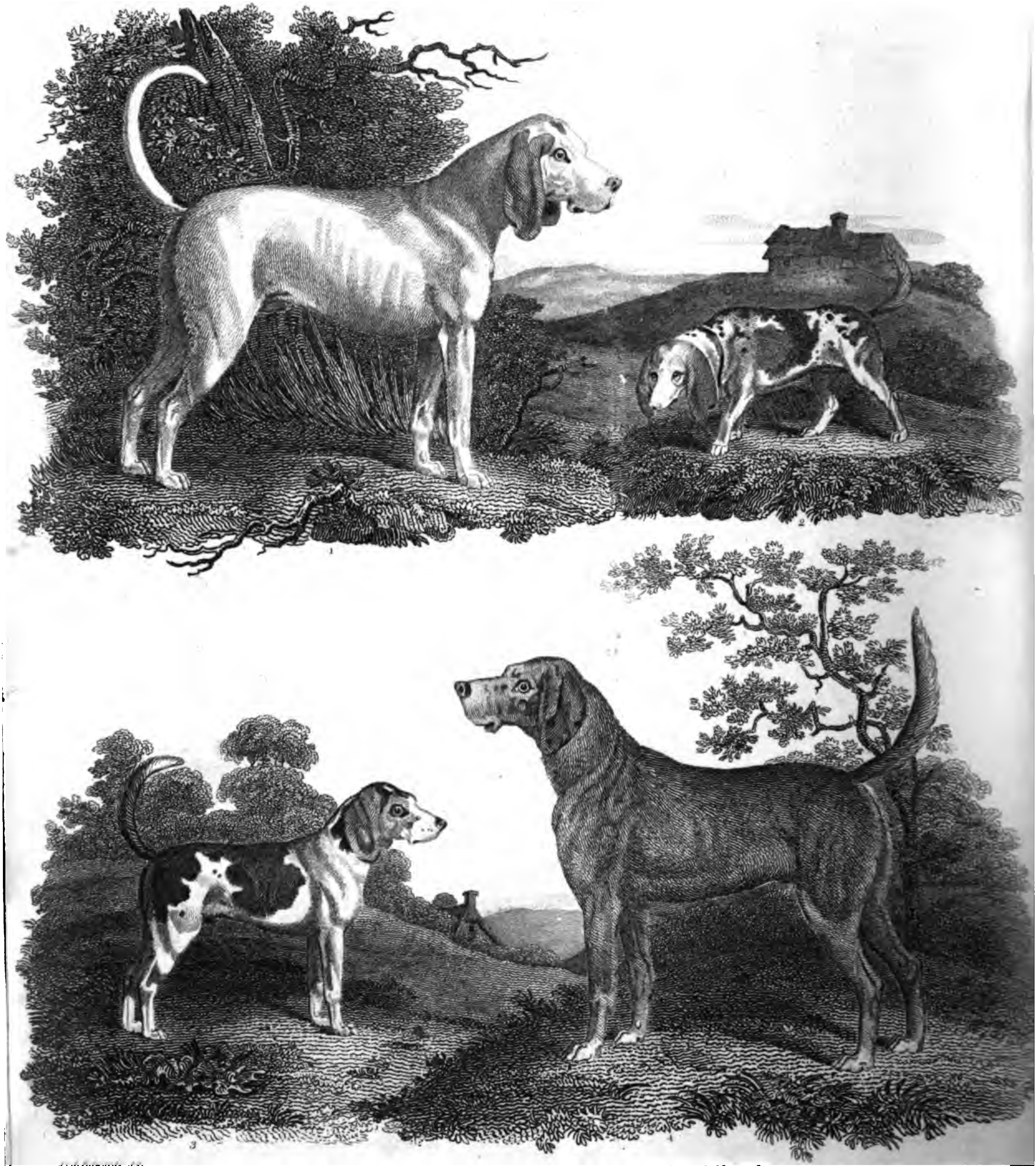
THE CRATER OF MOUNT VESUVIUS.

Linn. Syst.

QUADRUPEDS.

PLATE 90.

CLASS Ist MAMMALIA—ORDER IIId FERÆ—GENUS XV. CANIS.



1. Old English *or* Talbot Hound — 2. Beagle — 3. Harrier — 4. British Blood Hound.

The mineral contents of modern Vesuvius are augite, or pyroxene, felspar, leucite, mica, olivine, sulphur, &c. And an immense variety of mineral substances are found around the mountain, together with volcanic alluvions, formed at considerable distances, containing sand, scoriae, tuffa, pumice, lapilli, &c.

Since the erection of Pompeii, no stream of lava ever reached that city, its destruction having been effected by showers of lighter alluvial matter. Herculaneum was discovered very differently situated, in digging a well, in the year 1718, when they came down at once upon the theatre in which the statues of Hercules and Cleopatra were found. Pompeii was found to measure three miles in circumference, but that of Herculaneum is uncertain, and it appears to have been the only city destroyed by melted lava.

PLATE XC.—QUADRUPEDS.

Class MAMMALIA. Order FERAE. Genus CANIS.

The Dog. In a former page we gave the most prominent characteristics of this interesting animal. In this and the ensuing plate, the artist has figured some of the prominent varieties of the genus.

FIG. 1. *Old English* or *Talbot Hound. Canis Sagax*, LINN.

This is undoubtedly the origin of those famous hounds for which Great Britain is celebrated above all other countries. In former times this dog was of a pure white, but is now generally of a white and black colour, and tanned over the eyes.

This majestic animal is distinguished by his great size and strength: his body is long, his chest deep, and his ears long and sweeping, with great gravity of expression. From the particular formation of his organs, or from the extraordinary moisture which always flows from his nose, or from some other unknown cause, he is endowed with the most exquisite sense of smelling, and can discover scent hours after other dogs have given up.

Although the Talbot hunts with great certainty, yet he becomes tedious from the slowness of his motions; this, however, enables him to receive more distinctly the directions of the huntsman, and he can trace with a cold scent, which he is too apt to make so by his want of speed.

The Talbot, we are informed by Whitaker in his History of Manchester, was the original breed of England, and was used by the ancient Britons in the chase of the larger kinds of game with which that country at one time abounded. They were common in all parts of the kingdom, and were much larger than they are at present: and have been gradually declining in consequence of mixing them with lighter dogs for the purpose of increasing their speed.

It is said that the tone of his voice is peculiarly deep, sonorous, powerful, and mellow.

This dog is accurately described by Shakspeare in the following lines:—

> "My hounds are bred out of the Spartan kind,
> So flew'd, so sanded; and their heads are hung
> With ears that sweep away the morning dew;
> Crook-knee'd and dew-lapp'd like Thessalian bulls;
> Slow in pursuit, but matched in mouth like bells,
> Each under each."

FIG. 2. *The Beagle. Canis Perstans*, LINN.

This is the smallest of the dogs of the chase which go under the general denomination of Hound, meaning that kind which have the innate property of finding their game and pursuing it by what sportsmen call scent, which seems to be an impregnation of the atmosphere with a certain effluvia issuing from the pores of the skin, and acting upon the olfactory membrane of the dog's nose.

Although the beagle is far inferior in point of speed to the harrier, yet his sense of smelling a hare is equally exquisite, and he pursues her with indefatigable vigilance, energy, and perseverance. Every winding and all the mazes are traced by him with a degree of exactness which must be seen to be properly understood and justly estimated, while the soft and melodious tones of his voice afford ecstatic pleasure to the lovers of the chase, and are thus finely described by Somerville:—

> "Hark! from yon covert, where those towering oaks
> Above the humble copse aspiring rise,
> What glorious triumphs burst in every gale
> Upon our ravish'd ears! The hunter's shout,
> The clanging horns swell their sweet winding notes,
> The pack wide-opening load the trembling air
> With various melody; from tree to tree
> The propagated cry redoubling bounds,
> And winged zephyrs waft the floating joy
> Through all the regions near.——
> The puzzling pack unravel, wile by wile,
> Maze within maze."——

Much emulation prevailed in former times among sportsmen in the breeding of beagles, and it was then the greatest merit to rear dogs of the smallest growth. Amongst amateurs of hunting, beagles were so carefully selected in point of size, that they seldom exceeded ten or eleven inches in height; and they were so well matched with respect to speed, that during the chase a good pack might be covered with a sheet. This is with all kinds of hounds a sure mark of excellence.

Although beagles are slow in speed, they are uncommonly eager; for, if the scent lies well, a hare has little chance of escape from them. Their slowness, however, is the principal reason of their being almost totally discontinued in packs, and that they are now seldom to be met with beyond a few couples, used in some of the southern counties of England to insure *finding* more certainly in greyhound-coursing.

Hunting with the beagle was admirably adapted for ladies, and gentlemen in years; and, besides, afforded much amusement to rustics, and other pedestrian hunters; for there were few male persons of any activity who could not keep up with them.

The late Colonel Hardy once had a pack of beagles amounting to ten or twelve couples, and so diminutive in size, that they were always carried to and from the sporting-field in a large pair of panniers slung across a horse. This curious pack was lost to the Colonel in rather a singular manner. It was kept in a barn, which was one night broken open, when all the hounds and the panniers were stolen; and, notwithstanding the most diligent search, no trace of either could ever be discovered.

FIG. 3. *The Harrier. Canis Leverarius*, LINN.

This dog is now almost universally used in Great Britain for hare-hunting. He was originally generated in a double cross between the small beagle, the southern hound, and the dwarf-fox.

There are, however, various harriers produced by crosses introduced in breeding, dictated by knowledge and experience, and depending on the kind of country they hunt in, and the wish or fancy of the owner of the pack. All of which are bred by introducing either a larger or smaller cross, without a great alteration in the blood.

The harrier pursues the hare with great eagerness and speed, allowing her but little time to breathe or double. The keenest sportsmen often find it difficult to keep up with this dog, and with a strong hare it is rather fatiguing work. There is a great deal of melody and cheerful harmony in the voices of harriers during the chase.

Mr. Beckford, who was justly esteemed one of the best judges of dogs in Britain, endeavoured as far as possible to breed his harriers with much bone and strength within a small compass, and, at the same time, of a handsome make. These respective qualities he obtained; and his hounds ran remarkably well together, went fast, had all the alacrity that could be desired, and would hunt the coldest scent.

Although the harrier is the best adapted for hare-hunting, yet there are situations where he is too weak, being ill-suited for swampy and marshy lands, such as those of Lancashire and Lincolnshire, and many other places. The large slow southern hound seems best calculated for such localities. Harriers which are of a larger description, and crossed for the purpose of speed, are only superior in open countries, where, for want of covert, the hare will run five or six miles right out without a single turn. In such cases the pleasures of the chase may be compared to those of fox-hunting.

Inveterate stag and fox-hunters think hare-hunting only fit for boys and old men; but this sport, although not possessing that diversity attendant on a fox-chase, is nevertheless calculated to inspire a contemplative mind with more of the pleasure of hunting, as much more of the true spirit of the animal can be observed than in the other two.

Various modes are practised by huntsmen in searching for hares; but should one be found accidentally sitting in her form, the dogs are generally drawn off to prevent them killing her in her seat. The person who finds the hare, then walks quietly up to her, starts her, and she is allowed to go away at her own pace. The dogs are then led quietly to her form, and, when thus put upon the scent, they go off in a style of uniformity and vigour affording pleasure to all present.

Hares lie so close, and are so much the colour of the soil, that they are very difficult to be distinguished from it. Some people cannot see them in their form, even after they are pointed out. A gentleman, upon a coursing-party with his friends, was shown one in that position, who instantly exclaimed, "Is that a hare? then by Jove I found two this morning as we rode along!"

Fig. 4. *British Blood-Hound. Canis Sanguinarius*, Linn.

In the darker ages the blood-hound had the fabulous reputation of pursuing naturally with unerring precision, and of taking murderers, robbers, and other depredators, if he were laid on the footsteps of those intended to be pursued, within a certain given time. We, however, cannot give our assent to the character thus ascribed to him, although experience has taught us that all sorts of hounds may be *broken in* to follow any kind of scent, when resolutely taught that they are to run no other.

One of the principal uses in which the blood-hound was employed, was in recovering game that had escaped wounded from the hunter. And he was taught also to pursue felons, which he would do through thickets and the most secret coverts; and, if they had lately escaped, they were almost certain to be taken. For this reason, there was a law in Scotland enacting that whoever denied entrance to one of these dogs, in pursuit of stolen goods, should be deemed an accessory. And they were also much used on the borders between England and Scotland, which were greatly infested by robbers and murderers; and a tax was laid on the inhabitants for keeping and maintaining a certain number of these animals. The arm of justice is now, however, so effectually extended over Great Britain, and cultivation so general, that there are no secret haunts where villany can be concealed; which renders this part of the services of the blood-hound no longer necessary. In Scotland this dog was called the Sleuth-Hound. A few of this race are still kept in the royal forests for the purpose of finding deer that have been previously wounded; and even lately they have been employed in tracing deer-stealers, which they do from the blood which issues from the wounds of the animal.

The blood-hound is tall and most beautifully formed, and is usually of a reddish or brown colour, and exceeds in size, weight, strength, and courage, every other variety of hound. He possesses a kind of sagacious, or serious solemn dignity, admirably calculated to impress the marauder with dread and awe; and at one period, when he was destined to a single pursuit, he was kept a stranger to every other. Much care was taken to prevent those dogs from following the sports of the field, and they were scrupulously taught to trace the footsteps of man alone. At the time they were so much in use, deer-stealing was extremely prevalent in Great Britain, which rendered a constant vigilance on the part of park-keepers necessary; and, when necessity required, in their nocturnal watching, to trace a depredator, when once laid upon the scent, they so closely and keenly pursued, that they infallibly traced and discovered the offending party.

The Dog of Montargis.

The fame of an English blood-hound has been deservedly transmitted to posterity by a monument in basso-relievo, which still remains in the chimney-piece of the grand hall at the castle of Montargis, in France. The sculpture, which represents a dog fighting with a champion, is explained by the following narrative:—

Aubri de Mondidier, a gentleman of family and fortune, travelling alone through the Forest of Bondy, was murdered, and buried under a tree. His dog, a blood-hound, would not quit his master's grave for several days; till at length compelled by hunger, he proceeded to the house of an intimate friend of the unfortunate Aubri at Paris, and, by his melancholy howling, seemed desirous of expressing the loss they had both sustained. He repeated his cries, ran to the door, looked back to see if any one followed him, returned to his master's friend, pulled him by the sleeve, and, with dumb eloquence, entreated him to go with him.

The singularity of all these actions of the dog, added to the circumstance of his coming there without his master, whose faithful companion he had always been, prompted the company to follow the animal, who conducted them to a tree, where he renewed his howl, scratching the earth with his feet, and significantly entreating them to search the particular spot. Accordingly, on digging, the body of the unhappy Aubri was found.

Some time after, the dog accidentally met the assassin, who is styled, by all the historians that relate this fact, the Chevalier Macaire; when, instantly seizing him by the throat, he was with great difficulty compelled to quit his victim.

In short, whenever the dog saw the Chevalier, he continued to pursue and attack him with equal fury. Such obstinate violence in the animal, confined only to Macaire, appeared very extraordinary, especially to those who at once recalled the dog's remarkable attachment to his master, and several instances in which Macaire's envy and hatred to Aubri de Mondidier had been conspicuous.

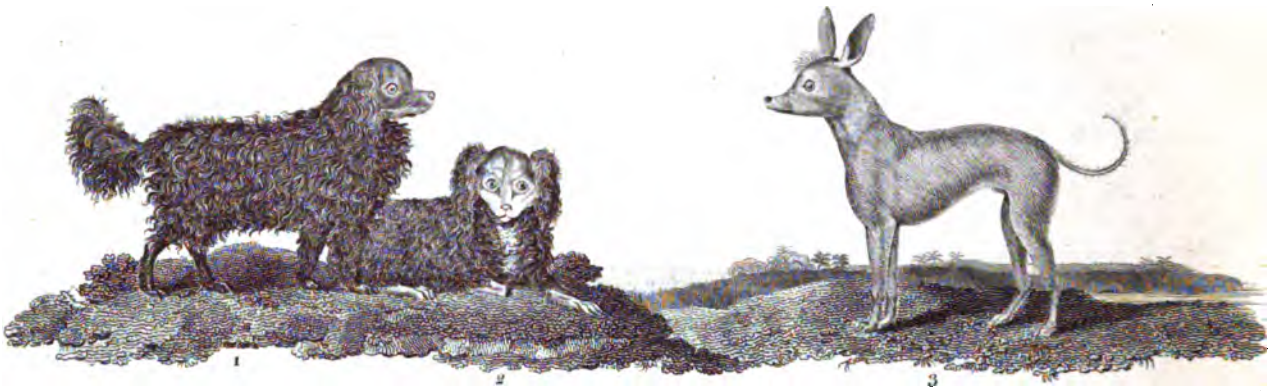
Additional circumstances created suspicion, and at length the affair reached the royal ear. The King (Louis VIII.) accordingly sent for the dog, which appeared extremely gentle, till he perceived Macaire in the midst of several noblemen, when he ran fiercely towards him, growling at and attacking him as usual.

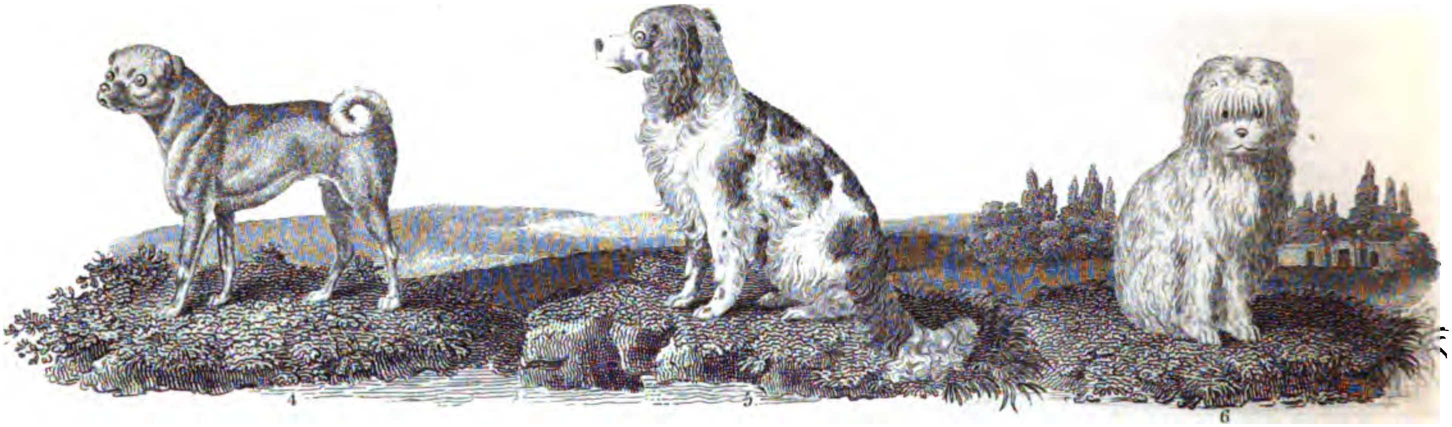
The King, struck with such a combination of circumstantial evidence against Macaire, determined to refer the decision to the chance of battle; in other words, he gave orders for a combat between the Chevalier and the dog. The lists were appointed in the Isle of Notre Dame, then an unenclosed, uninhabited place, and Macaire was allowed for his weapon a great cudgel.

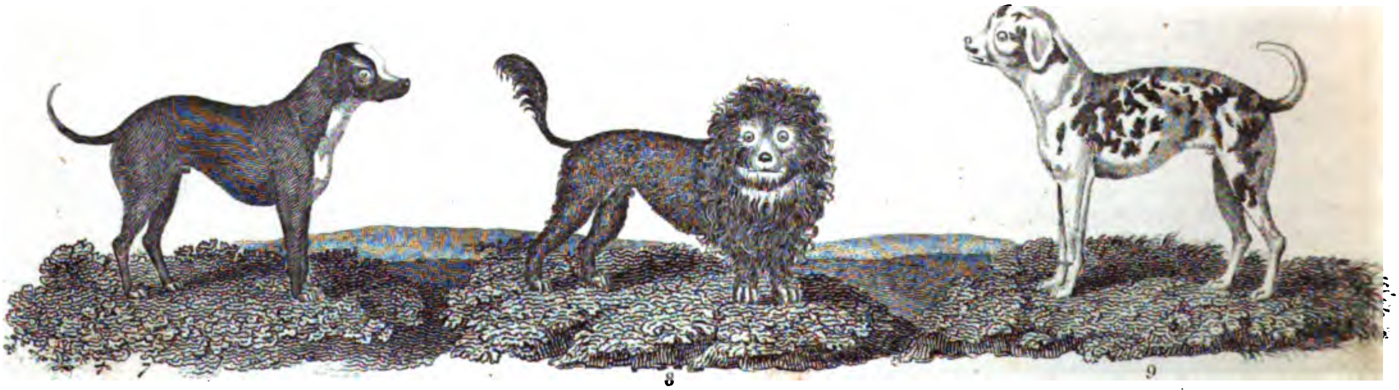
An empty cask was given to the dog as a place of retreat, to enable him to recover breath. Everything being prepared, the dog no sooner found himself at liberty, than he ran round his adversary, avoiding his blows, and menacing him on every side, till his strength was exhausted; then springing forward, he seized him by the throat, threw him on the ground, and obliged him to confess his guilt in presence of the King and the whole

QUADRUPEDS.

CLASS I.st MAMMALIA_*ORDER III.d* FERÆ_*GENUS XV* CANIS.







1.King Charless Dog_2.Pyrame_3.Nakid *or* Turkish Hound_4.Pug_5.Spaniel_6.Shock_7.Small Dane_8.Lion Dog_9.Boquet.

court. In consequence of this, the Chevalier, after a few days, was convicted upon his own acknowledgment, and beheaded on a scaffold in the Isle of Notre Dame.

PLATE XCI.—QUADRUPEDS.

The same class, order, and genus.

Fig. 1. *King Charles's Dog*, or *Smaller Spaniel. Canis Brevipilis*, Linn.

This beautiful little animal is seldom used for field-sports, from his diminutive size, being easily tired, and is too short in the legs to get through swampy ground.

This dog is found of all colours; but those which are black, with tanned cheeks and legs, are considered the purest breed. He gets the name of King Charles's Dog from the extreme liking the second monarch of that name had for this animal, as he never went out without being followed by eight or a dozen of them. They were also introduced into most of the portraits of himself and family, and particularly in that by Vandyke. They were also his constant companions in the palace.

The use of this variety at present is as a lapdog, and they are consequently prized in proportion to the diminutiveness of their size.

Fig. 2. *The Pyrame.*

A variety of the foregoing, differing in no essential particular.

Fig. 3. *Nakid*, or *Turkish Hound.*

A ferocious, and vindictive little animal, kept by the Turks for the purpose of guarding their premises, and worrying their foes.

Fig. 4. *The Pug Dog. Canis Pricator*, Gmelin.

This variety is so nearly allied to the bull-dog (from which he is descended by a cross with the small Danish, fig. 7,) in form and general appearance, that a detailed description is quite unnecessary. The chief difference is in its size, being much smaller, and its tail curled upon its back. It differs extremely in another particular, which is in courage, this animal being as timid as the other is valiant.

There is a Sunday market at Moscow, where German pug-dogs, which are so dear in London, can be bought for a sum of money equivalent to a shilling.

Dumfries Miracle.—The animals of Dumfries-shire are a good deal celebrated, and not, it would appear, without reason. A speaking dog actually exists at the house of Mr. ———, writer in that town. His name is Wellington, his size moderate, his shape handsome, and he is usually denominated the Dutch Pug. The editor of the Dumfries Courier declares most solemnly, that he heard him repeatedly pronounce the word William, almost as distinctly as ever it was enunciated by the human voice. About a fortnight ago, (January, 1829,) he was lying on a rug before the fire, when one of his master's sons, whose name is William, to whom he is more obedient than to any body else, happened to give him a shove, and then the animal ejaculated, for the first time, the word William! The whole fireside were as much amazed as Balaam was when his ass spoke; and though they could hardly believe their own ears, one of them exclaimed, "Could you really find it in your heart to hurt the beast, after he has so distinctly pronounced your name?" This led to a series of experiments, which have been repeated for the satisfaction of various persons; but still the animal performs with difficulty. When his master seizes his fore-legs, and commands him to say William, he treats the hearer with a gurring voluntary; and after this species of music has been protracted for a longer or a shorter period, his voice seems to fall a full octave before he comes out with the important dissyllable.

Fig. 5. *The Spaniel. Canis Extrarius*, Linn.

The spaniel has the hair very long in parts; it is generally white, with large brown, liver-coloured, or black spots, of irregular shape and size; the nose is sometimes cleft; the ears are very long and pendulous, and covered with long hair. This race came originally from Spain, whence its name. The setter is sometimes called the *English spaniel.* It corresponds in every point, with the true spaniel, but is trained more particularly for field sports. The Alpine or St. Bernard's variety of the spaniel breed, exceeds all others in size and beauty. If is generally two feet high at the shoulders, and full six feet from the nose to the end of the tail. These dogs are sent out in couples, to scour the mountain in search of lost or wearied travellers. They have frequently been of great use in this way.

Fig. 6. *The Shock Dog. Canis Fotor*, Linn.

This variety is probably a breed betwixt the King Charles dog and the small water-spaniel, to which last it seems most nearly allied. It has long and slightly-curled hair, and its eyes are almost hid in the curls. It is of a small size, and is used as a lapdog. It is a useless little animal, seeming to possess no other quality than a faithful attachment to its mistress.

They will not take the water, although they possess all the requisites for swimming. This may probably be accounted for from the frequency of their immersion in that element, contrary to their inclination, for the purpose of washing them.

A Faithful Shock Dog.—In October, 1803, during the deluge with which the island of Madeira was visited, a remarkable circumstance happened near St. John's River. A maid-servant, in flying from one of the falling houses, dropped an infant from her arms, which was supposed to have perished. Next day, however, it was found, unhurt, on a dry piece of ground, along with a shock dog, belonging to the same family. The dog was close by the child, and it is imagined that the child was kept alive by the warmth of the faithful animal's body.

Fig. 7. *The small Danish Dog. Canis Dubius*, Linn.

We do not see what reason Buffon could have for calling this variety the small Danish dog, as there is not the slightest connexion betwixt it and the large Danish dog. This variety is only a cross originating in the pug-dog and some other diminutive mongrel, or in all probability from a succession of crosses. He is a handsome little animal, and bears a strong resemblance in some respects to the Turkish greyhound; his head is round, eyes large, muzzle short, but rather sharp, chest deep, and limbs fine and well proportioned. The colour of his skin is various.

Fig. 8. *The Lion Dog. Canis Leoninus*, Gmelin.

This interesting animal is supposed to have originated between the little spaniel and one of the naked varieties, probably the small Turkish greyhound, and is most likely also crossed with the small water-spaniel and the Danish Dog.

The hair about his head, neck, and shoulders, is long and silky, with a small bush of hair at the extremity of his tail; on all other parts of the body it is very short, giving the little animal a leonine appearance. He is used only as a pet or lapdog.

Fig. 9. *The Roquet. Canis Hybrides*, Gmelin.

The roquet resembles the small Danish dog in his general shape, and, like him, has a round head and large eyes, small ears, partly erect, and somewhat pendulous at the tips; his snout is rather large, short, and a little turned up like that of the pug; the tail is elevated, and sweeps forward on his back in the same manner; his hair also is like that of the other in colour, although sometimes he is to be found white, with brown or liver-coloured spots.

PLATE XCII.—ORNITHOLOGY.

Order Passeres. Genus Motacilla. Genus Pipra.

Fig. 1. *Black-headed Warbler. Motacilla Pileata*, Linn. and Cuv.

Described by Dr. Latham, who informs us that it is a native of the Cape of Good Hope, where it is called *Schaap Wagter:* it is the size of the white-rump: length six inches: beak black: head black, uniting on each side the neck with a deep crescent of the same: the eyebrows are white: forehead and chin the same: the back and wing russet-brown: rump, belly, and tail, white, the whole of the two middle, and tips of the other, feathers of the latter excepted, which are black. It approaches near to the common species.

Fig. 2. *Thorn-tailed Warbler. Motacilla Spinicauda*, Linn. *Certhia Spinicauda*, Cuv.

A very singular species, described and figured by Dr. Latham; who informs us that it is the "size of a sparrow: length (the appendage of the tail included) more than six inches: beak three quarters of an inch, straight, except the very tip: base of the under mandible white: the head and upper part of the body dusky reddish brown, mottled with yellow on the crown: between the beak and eye yellow, passing in a streak over the eye to the hind head, where it is rufous: the wing-coverts are rufous, mixed with brown, except the shoulder, which is white: the under parts of the body, from chin to vent, are white also: the greater coverts and quills brown, with pale margins: the tail is cuneiform in shape, and of a very singular construction; for the end of each feather, for about one-third of its length, is almost bare of webs, ending in a point; the four middle feathers are ferruginous; the other reddish brown, with the ends white: the legs are brown, one inch in length. Inhabits Terra del Fuego."

Fig. 3. *Blue-throated Warbler. Motacilla Suecica*, Linn. *Silvia Suecica*, Cuv.

This beautiful species is nearly the size of the red-breast: the upper parts of its plumage are greenish: the eyebrows white: the throat, and fore-part of the neck, are of a bright azure blue; beneath which is a black border, then red: the belly, thighs, and vent, are dusky white: the tail is brown, with the base of all but the two middle feathers orange-red: the female has the throat white: across the neck a band of blue, edged with one of black beneath: in other respects she resembles the male: in some specimens of the male there is a beautiful silvery spot in the middle of the blue on the front of the neck: the young do not obtain the blue breast till some time after leaving the nest; that part is then spotted with brown, and, when confined, that colour disappears after the first month.

Common in many parts of Europe from Sweden to Gibraltar, but not found in Britain: it frequents marshy places, fixing its nest on willows: it is often eaten, and is esteemed very good: it has an agreeable song, which is often uttered in the night.

Fig. 4. *Rock Manakin*, or *Cock of the Rock. Pipra Rupicola*, Linn. *Rupicola vulgaris*, Cuv.

The crested or rock manakin is the size of a middle-sized pigeon; being about a foot in length: beak yellowish; above an inch long: head with a flattened semicircular crest: prevailing colour of the plumage saffron-orange: quills part white, part brown; their coverts loose and fringed: upper tail-coverts long, slightly webbed, and truncated at the end: base of the ten inner tail-feathers orange, tips brown; outer feathers orange on the inner web at the base, the other part brown; all the feathers margined with orange: legs, and claws, yellow: female entirely brown, except the wing-coverts, which are rufous orange: slightly crested: young bird of a yellowish brown colour, or gray.

This elegant species is found in many parts of South America in rocky situations, and builds its nest in dark sequestered recesses, of dry bits of stick, laying two round white eggs: it is a shy bird. The female is said by Salerne to assume the plumage of the male in the ensuing moult after having ceased to lay, in the same manner as many of the gallinaceous kinds are known to do; both sexes are said to be a year before they arrive at their full plumage.

Fig. 5. *Striped-headed Manakin. Pipra Striata*, Linn. and Cuv.

Described by Dr. Latham, from a specimen in the possession of Sir Joseph Banks, as follows: "length four inches and a half: beak brown: crown of the head and nape black, with a stripe of white down the shafts of each feather: hind part of the neck and back of a brownish ash-colour, inclining to olive near the rump: between the beak and eye a deep yellow spot: the wing-coverts are brownish: the bastard wings tipped with white, and some of the outer coverts tipped with yellow, making an oblique band near the outer edge of the wing: the quills dusky; the third shorter in proportion than any of the others, being a quarter of an inch shorter than the second, though all the others are of the usual length: the under parts of the bird are yellowish, growing very pale near the vent: under tail-coverts are buff-colour: the tail black; very short: the outer feathers tipped with white: legs dusky." Supposed to inhabit Van Dieman's Land.

Fig. 6. *White-capped Manakin. Pipra Leucocephala*, Linn. *Pipra Leucocapilla*, Cuv.

The white-headed manakin is a native of Surinam, and is the size of a wagtail: beak rather strong; the base ornamented with a few strong bristles: the entire head white: rest of the body black.

Fig. 7. *Speckled Manakin. Pipra Punctata*, Linn. *Pardalotus Punctatus*, Cuv.

This variable species is a native of New Holland. In one specimen mentioned by Dr. Latham, the bill was black: forehead, and between the beak and eye, yellowish: the top of the head and back of the neck black, marked with pale spots: back and wing-coverts brownish yellow, with the middle of each feather dark brown: the outer edge of the wing, quills, and tail, black, with white spots: all the under parts of the body yellowish white, with a red tinge on the breast: rump crimson; lower part of the back dull yellow: legs brown: another had only the top of the head black, spotted with white: hind part of the neck blue gray: forehead, and between the beak and eye, yellowish: the yellowish colour passing through the latter.

PLATE XCIII.—ORNITHOLOGY.

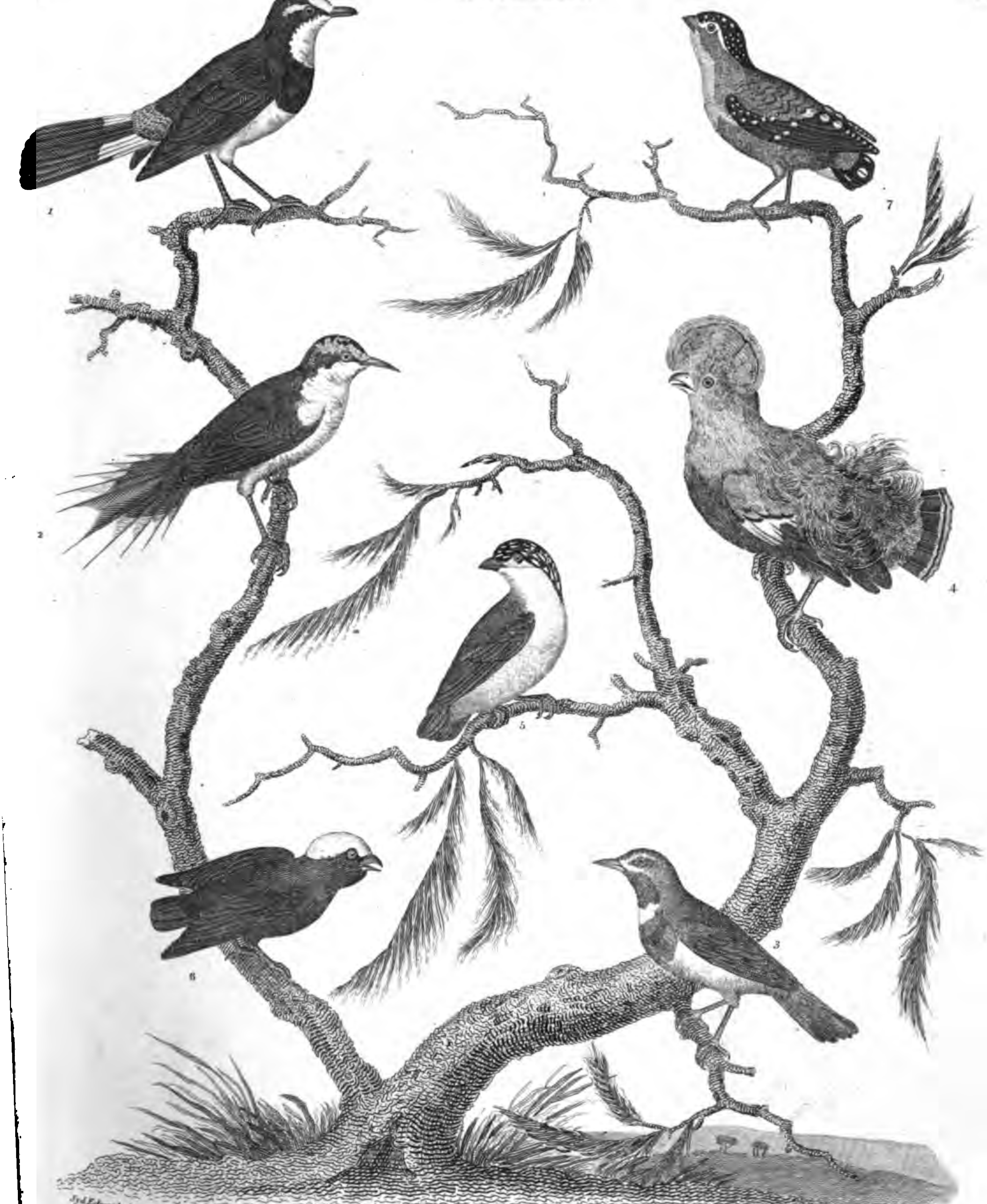
Water Birds. Order Anseres. Genus Anas, the Swan.

Fig. 1. *Sheldrake. Anas Tardona*, Linn. and Cuv.

Not quite two feet in length: the beak and its fleshy protuberance in front of a blood-red: the irides brown: the head and neck of a very dull green: the lower part of the neck, the wing-coverts, back, sides, rump, and base of the tail are pure white: the scapulars, a large band on the middle of the belly, the vent, quills, and the tips of the tail-feathers deep black: a broad red band surrounds the breast, and reaches upwards to the top of the back: the speculum of the wing is purple-green: the under tail-feathers are red: the legs are flesh coloured. The female is smaller, and is nearly destitute of the fleshy pro-

ORNITHOLOGY.

an.Syſt. Order PASSERES. *PLATE 9*



Syd.Edwards del. *Vallance sculp.*

G. *MOTACILLA*
(Warbler)

GENUS *PIPRA* (Manakin)

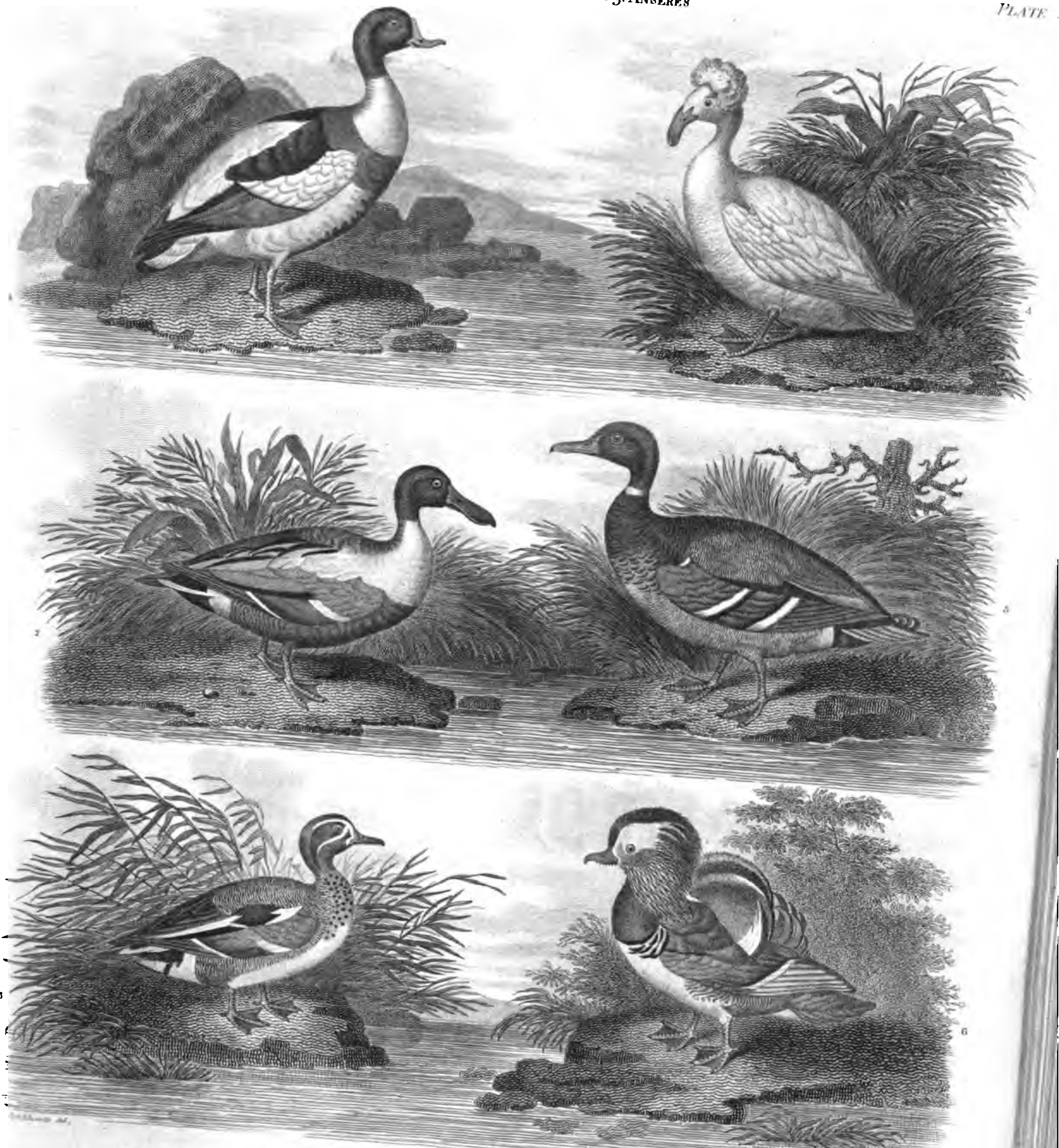
1.M. *pileata.* BLACK-HEADED W.
2.M. *Spinicauda.* THORN-TAILED W.
3.M. *Suecica.* BLUE-THROATED W.
4.P. *Rupicola.* ROCK M.
5 P. *Striata.* STRIPED-HEADED M
6.P. *Leucocephala.* WHITE-CAPPED M.
7.P. *Punctata.* SPECKLED M.

Linn. Syſt.

ORNITHOLOGY.

Div.ⁿ 2.ᵈ Water Birds — Order 3.ᵈ ANSERES

PLATE



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W.J. Lowry sc.

1. A. *Tardona*
SHELDRAKE.

2. A. *Clypeata*
SHOVELER.

3. A. *Crecca*
TEAL.

GENUS ANAS
(Swan)

4. A. *Curvirostra*
HOOK BILLED DUCK.

5. A. *Boschas*
MALLARD.

6. A. *Galericulata*
MANDERINE DRAKE.

tuberance on the base of the beak, on which part there is a small whitish spot: all the colours of the plumage are much duller than in the male: the pectoral band is narrower, and the black band which extends across the belly is very straight, and is often marked with larger white spots. The young of the first year have the face, the hinder and lower parts of the neck, the back, and the under parts of the body white: the head, cheeks, and nape brown, dotted with white: the breast bright reddish: the scapulars of a dusky ash, edged with bright ash: the lesser wing-coverts are white, edged with ash: the tail is tipped with ashy-brown: the beak is reddish-brown: the legs livid.

The structure of the trachea in the male of this bird is different from that of any other European species: this organ is furnished with a labyrinth, composed of two roundish bladders of a most delicate texture, one of which is larger than the other; both are uneven on the surface, and of so tender a fabric as scarcely to bear the pressure of the finger without fracture.

Inhabits the north and western parts of Europe, and some parts of Asia, preferring the sea-coasts, never from choice quitting its marine haunts. It is not uncommon on the British coasts, and remains all the year. The female makes her nest, and rears her young, under ground, in the rabbit-holes which are made in the sand-hills near the sea-shore: the nest is usually formed of the fine down plucked from her breast: she lays ten or twelve roundish white eggs, which are hatched in about thirty days, the male assisting in the process of incubation. Both sexes are very attentive to their young, and are said to carry them from place to place in their beaks, especially when the nest is situated at some distance from the water: if they happen to be interrupted during such times, the young are sheltered, and the parent birds fly off, and drop at a short distance, trailing themselves along the ground, and appear to struggle as if wounded, in order to tempt a pursuit after them, and should they succeed, they instantly return to their helpless charge. They will sometimes breed with the common duck, and, according to Montagu, bear confinement well, and appear to enjoy perfect health, provided they are allowed communication with a pond. Their principal food consists of sea-weed, small shellfish, marine insects, and small fishes.

Fig. 2. *Shoveller. Anas Clypeata*, Linn. and Cuv.

Length upwards of eighteen inches; beak broad and spatulaform, black, but yellowish beneath; irides yellow; the head and neck deep glossy green; breast pure white; the belly and sides of a chestnut red; the back of a blackish-brown; the wing-coverts clear blue; the scapulars are white, marked with dots and streaks of blackish; the speculum of the wing is deep green; the legs are reddish-orange. The female has the head of a clear red, marked with small black streaks; the feathers on the upper parts are blackish-brown, edged with whitish-red; the under parts are reddish-white, marked with large brown spots; the lesser wing-coverts are dull blue; the speculum is blackish-green; the beak is blackish-brown, with its edges and under parts brown; the irides are bright yellow. The young male in the autumn, and the old during moulting, have some feathers proper to the dress of the males in winter, and others proper to the female or the young male before moulting; these feathers are indistinctly mixed.

The trachea of the male is very slightly enlarged towards the inferior larynx, and has a small osseous protuberance, which is rather dilated below, on its left side; the bronchiæ are very long.

Inhabits various countries of the north of Europe and of America, frequenting the marshes, lakes, and rivers, and occasionally visiting the sea-coasts; in which situation it is perpetually searching for small worms and the larvæ of insects, sifting, with great address, the watery mud through the long and finely set teeth of its curious beak, which is admirably constructed for the purpose, being large, and capable of retaining very minute worms, seeds, or insects, which constitute the principal food of the bird. The female is said to make her nest on the ground, with withered grass, in the most inaccessible part of the marsh, and to lay ten or twelve rust-coloured eggs: the young, as soon as hatched, are conducted to the water by the parent birds; at first they are very shapeless and ugly, as the beak is then as broad as the body, and is quite out of proportion to the size of the bird: their plumage does not acquire its full colours until after the second moult.

This beautiful species is sometimes met with in England, but by no means common: they do not, however, breed in that country, so far as is yet ascertained; but are said to be not unfrequent in France, where they arrive in February, and disperse and breed in the marshes. They are of so wild, shy, and solitary a disposition, that all attempts hitherto made to domesticate them have failed.

Fig. 3. *Teal. Anas Creca*, Linn. and Cuv.

Length fifteen inches; beak dusky; irides brown; the top of the head, cheeks, and neck are chestnut-red; the throat is black; a broad green band extends from the eyes to the nape; the inferior part of the neck, the back, scapulars, and sides are alternately striped with zigzag lines of white and black: the breast is reddish, varied with round spots; the belly is white, or yellowish-white; the wing-coverts are brown; the speculum of the wings is half white, half black, and edged with two white bands; the legs are ash-coloured. The female is less, and has a reddish-white band, spotted with brown, behind and beneath the eyes; the throat is white; the plumage above is blackish-brown, edged with a broad band of clear brown; the under parts are whitish; the beak is marbled with brown, and is of a yellowish-brown beneath, near its edges. The young males before their moult resemble the females; and at the beginning of winter they have the throat white, sometimes spotted with black; the red and green on the head are indistinct, and sprinkled with small white and reddish spots; many of the feathers are brown, mixed with those that are common to the old males; the upper band which borders the speculum is spotted or shaded with reddish; and the white feathers on the belly are often sprinkled with black.

The labyrinth at the bottom of the trachea of the male is very small, of a bony texture, but very thin, and of a suborbicular shape, about the size of a pea.

This species affects northern regions, and occurs equally in those of Europe and America: it is very abundant in England during its migration; but it does not appear usually to breed there, although its nest is said to be not uncommon in France. The nest is large, and is composed of soft dried grasses, lined with feathers, and generally concealed in a hole among the roots of reeds and bull-rushes near the edge of the water, and, according to some persons, placed in such a manner as to rise or fall with the water. The female lays about a dozen reddish-white eggs, which are indistinctly sprinkled with brown dots; they are about the size of those of a pigeon.

The teal is the least bird of this family; it frequents ponds, marshes, and the reedy shores of creeks, inlets, and rivers; it flies in small flocks, and feeds at night; its flesh is excellent.

Fig. 4. *Hook-billed Duck. Anas Curvirostra*, Linn.

Apparently distinct from the wild duck, than which it is rather larger; its beak is similar, but bent downwards; irides fulvous; the prevailing colour of the plumage is deep black, with the quills and under parts dull; the head, neck, and rump are slightly tinged with shining gray; on the throat is an oval white spot; the five outer quills are white; the rest black; the exterior secondary quill is margined with white at its tip on the outer edge; but the outer margins in general have a blue-black gloss, and form a speculum of that colour on the wing; the tail as in the wild duck, with the four middle feathers recurved. Described by Pallas: its native country is unknown.

FIG. 5. *Mallard*, or *Wild Duck*. *Anas Boschas*, LINN. and CUV.

About twenty-two inches in length; the beak is greenish yellow; the irides reddish-brown; the head and neck are very deep green; at the base of the neck is a white collar; the upper parts of the plumage are striped with very fine zigzags of ashy-brown and grayish-white; the breast is very deep chestnut; the rest of the under parts are gray-white, rayed with very fine ashy-brown zigzags; the speculum of the wing is violet-green, edged above and below with a white band; the four middle tail-feathers are recurved; the legs are orange. The female is less; all the plumage is varied with brown on a grayish ground; the throat is white; a whitish band, spotted with brown, passes above the eyes, and a dusky one through them; the speculum resembles that of the male, but is not shaded with violet; the four middle tail-feathers are straight; the beak is grayish-green; the irides brown. The young males, before they moult, resemble the females. It varies much in colour. The trachea of the male has a globular or labyrinthic cavity, about three quarters of an inch in diameter, just before the entrance into the lungs.

In a domestic state some individuals appear in nearly the same plumage as the wild ones; others vary greatly from them, as well as from each other, and are marked with nearly every colour; but all the males, or drakes, still retain the curled feathers of the tail. The Tame Duck is, however, of a more dull and less elegant form and appearance than the Wild, domestication having deprived it of its lofty gait, long tapering neck, and sprightly eyes.

Wild Ducks inhabit all the northern countries of the globe, and are found throughout the greater portion of Europe; in the arctic regions they appear to be most abundant; they are common in Britain, and breed on rivers and lakes, sometimes at a considerable distance from the water. They scrape together a heap from such vegetables as are contiguous for a nest, and lay from ten to eighteen bluish-white eggs. They have been known sometimes to lay their eggs in a high tree, in a deserted magpie or crow's nest; and an instance has likewise been recorded of one being found at Etchingham, in Sussex, sitting upon nine eggs, in an oak, at the height of twenty-five feet from the ground; the eggs were supported by some small twigs placed crossways. The female, during the period of incubation, usually plucks the down from her breast to line her nest, and frequently covers the eggs when she leaves them. Wild Ducks pair; but when domesticated become polygamous.

The flesh of the Wild Duck is in general and high estimation; and the ingenuity of man, in every country where it frequents, has been employed in inventing stratagems to capture these artful and wary birds, and procure a delicacy for the table. A few of the most simple and effective of their contrivances may be mentioned.

Wilson relates that in America the following singular methods are used: "In some ponds frequented by these birds, five or six wooden figures, cut and painted so as to represent Ducks, and sunk, by pieces of lead nailed to their bottoms, so as to float at the usual depth on the surface, are anchored in a favourable position for being raked from a concealment of brush, &c. on shore. The appearance of these usually attracts passing flocks, which alight and are shot down. Sometimes eight or ten of these painted wooden Ducks are fixed in a frame in various swimming postures, and secured to the bow of the gunner's skiff, projecting before it in such a manner that the weight of the frame sinks the figures to their proper depth; the skiff is then dressed with sedge or coarse grass in an artful manner, as low as the water's edge; and under cover of this, which appears like a covey of Ducks swimming by a small island, the gunner floats down sometimes to the very skirts of a whole congregated multitude, and pours in a destructive and repeated fire of shot amongst them. In winter, when detached pieces of ice are occasionally floating in the river, some of the gunners on the Delaware paint their whole skiff or canoe white, and laying themselves flat at the bottom, with their hand over the side, silently managing a small paddle, direct it imperceptibly into or near a flock, before the Ducks have distinguished it from a floating mass of ice, and generally do great execution among them. A whole flock has sometimes been thus surprised asleep, with their heads under their wings. On land, another stratagem is sometimes practised with great success; a large tight hogshead is sunk in the flat marsh, or mud, near the place where Ducks are accustomed to feed at low water, and where, otherwise, there is no shelter; the edges and top are artfully concealed with tufts of long coarse grass and reeds, or sedge. From within this the gunner, unseen and unsuspected, watches his collecting party, and when a sufficient number offers, sweeps them down with great effect."

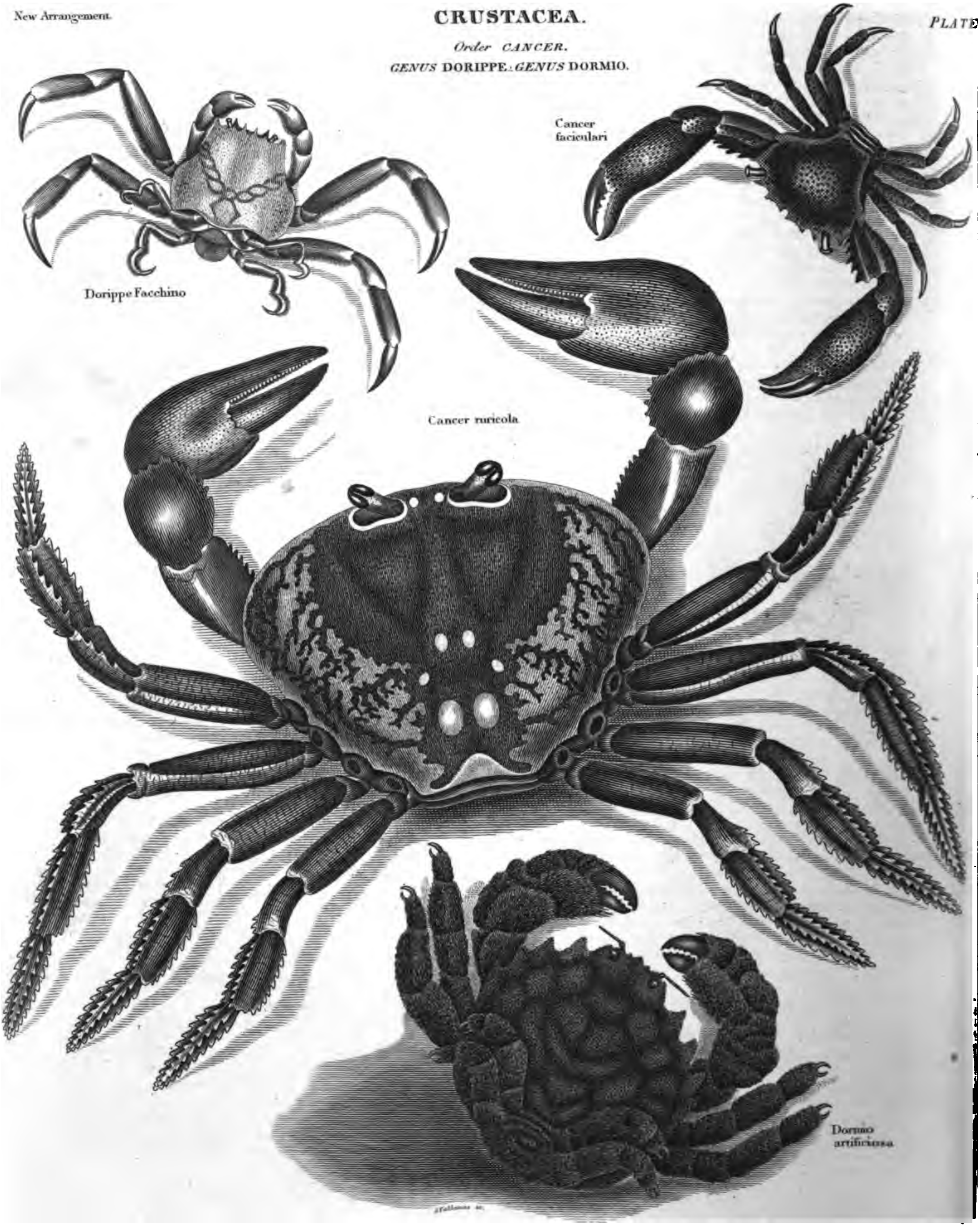
But these methods, which require much watching, toil, and fatigue, are vastly inferior to the decoys used in England, particularly in the fens of Lincolnshire, where many thousands are taken at a time. The following is Bewick's circumstantial account of them:

"In the lakes where they resort, the most favourite haunts of the fowl are observed; then in the most sequestered part of this haunt they cut a ditch about four yards across at the entrance, and about fifty or sixty yards in length, decreasing gradually in width from the entrance to the farther end, which is not more than two feet wide. It is of a circular form, but not bending much for the first ten yards. The banks of the lake, for about ten yards on each side of this ditch (or pipe, as it is called) are kept clear from reeds, coarse herbage, &c. in order that the fowl may get on them to sit and dress themselves. Across this ditch, poles on each side, close to the edge of the ditch, are driven into the ground, and the tops bent to each other, and tied fast. These poles at the entrance form an arch, from the top of which to the water is about ten feet. This arch is made to decrease in height, as the ditch decreases in width, till the farther end is not more than eighteen inches in height. The poles are placed about six feet from each other, and connected together by poles laid lengthwise across the arch and tied together. Over them a net with meshes sufficiently small to permit the fowl getting through is thrown across, and made fast to a reed fence at the entrance, and nine or ten yards up the ditch, and afterwards strongly pegged to the ground. At the farther end of the pipe a tunnel net, as it is called, is fixed, about four yards in length, of a round form, and kept open by a number of hoops about eighteen inches in diameter, placed at a small distance from each other to keep it distended. Supposing the circular bend of the pipe to be to the right, when you stand with your back to the lake, on the left-hand side a number of reed fences are constructed, called shootings, for the purpose of screening from sight the *decoy-man*, and in such a manner, that the fowl in the decoy may not be alarmed while he is driving those in the pipe; these shootings are about four yards in length, and about six feet high, and are ten in number. From the end of the last shooting a person cannot see the lake, owing to the bend of the pipes; there is then no farther occasion for shelter. Were it not for these shootings, the fowl that remain about the mouth of the pipe would be alarmed, if the person driving the fowl already under the net should be exposed, and would become so shy as to forsake the place entirely. The first thing the decoy-man does when he approaches the pipe is to take a piece of lighted turf or peat, and hold it near his mouth, to prevent the fowl smelling him. He is attended by a dog taught for the purpose of assisting him; he walks very silently about half-way up the shootings, where a small piece

CRUSTACEA.

Order CANCER.

GENUS DORIPPE. *GENUS* DORMIO.



J. Fullarton sc.

of wood is thrust through the reed fence, which makes an aperture just sufficient to see if any fowl are in; if not, he walks forward to see if any are about the mouth of the pipe. If there are, he stops and makes a motion to his dog, and gives him a piece of cheese or something to eat; upon receiving it he goes directly to a hole through the reed fence, and the fowl immediately fly off the bank into the water; the dog returns along the bank between the reed fences and the pipe, and comes out to his master at another hole. The man now gives him another reward, and he repeats his round again, till the fowl are attracted by the motions of the dog, and follow him into the mouth of the pipe. This operation is called working them. The man now retreats farther back, working the dog at different holes till the fowl are sufficiently under the net; he now commands his dog to lie down still behind the fence, and goes forward to the end of the pipe next the lake, where he takes off his hat, and gives it a wave between the shooting; all the fowl under the net can see him, but none that are in the lake can. The fowl that are in sight fly forward, and the man runs forward to the next shooting and waves his hat, and so on, driving them along till they come to the tunnel net, where they creep in; when they are all in, he gives the net a twist, so as to prevent their getting back; he then takes the net off from the end of the pipe with what fowl he may have caught, and takes them out one at a time, and dislocates their necks, and hangs the net on again, and all is ready for working again. In this manner five or six dozen have been taken at one drift. When the wind blows directly in or out of the pipes, the fowl seldom work well, especially when it blows in. If many pipes are made in the lake, they are so constructed as to suit different winds. The better to entice the fowl into the pipe, hemp-seed is strewed occasionally in the water. The season allowed by act of parliament for catching these birds in this way is from the latter end of October till February.

"Particular spots or decoys, in the fen countries, are let to the fowlers at a rent of from five to thirty pounds per annum; and Pennant instanees a season in which thirty-one thousand two hundred Ducks, including Teals and Wigeons, were sold in London only, from ten of these decoys, near Wainfleet, in Lincolnshire. Formerly, according to Willoughby, the Ducks, while in moult and unable to fly, were driven by men in boats furnished with long poles, with which they splashed the water between long nets stretched vertically across the pools, in the shape of two sides of a triangle, into lesser nets placed at the point, and in this way, he says, four thousand were taken at one driving in Deeping fen; and Latham has quoted an instance of two thousand six hundred and forty-six being taken in two days, near Spalding in Lincolnshire; but this manner of catching them while in moult is now prohibited."

Prodigious numbers of these birds are also taken by decoys in Picardy in France, particularly on the river Somme. It is customary there to wait for the flocks' passing over certain known places; when the fowler, having ready a wicker cage containing a number of tame birds, lets out one at a time, which enticing the passengers within gun-shot, five or six are often killed at once by an expert marksman. They are also taken by means of hooks baited with raw meat, which the birds swallow while swimming on the water.

Other methods of catching Ducks are peculiar to certain nations; one of these, from its singularity, seems worth mentioning. A person wades into the water up to the chin; and, having his head covered with an empty calabash, approaches the place where the birds are, which not regarding an object of this kind, suffer the man freely to mix with the flock; when he has only to pull them by the legs under the water, one after another, and fix them to his belt till he is satisfied, returning as unsuspected by the remainder as when he first came among them. This curious method is frequently practised on the river Ganges, the earthen vessels of the Gentoos being then used instead of calabashes. These vessels are what the Gentoos boil their rice in; after having been once used, they are looked upon as defiled, and are thrown into the river as useless; and the Duck-takers find them convenient for this purpose, as the Ducks, from seeing them constantly float down the stream, pay no attention to them.

To this account may be added, that in China the rearing of Ducks is an object of great moment. In that country the major part of them are hatched by artificial heat; the eggs, being laid in boxes of sand, are placed on a brick hearth, to which is given a proper heat during the time required for hatching. The ducklings are fed with craw-fish and crabs, boiled and cut small, and afterwards mixed with boiled rice; and in about a fortnight they are able to shift for themselves. The Chinese then provide them with an old stepmother, who leads them where they are to find provender, being first put on board a sampane, or boat, which is destined for their habitation, and from which the whole flock, often, it is said, to the amount of three or four hundred, go out to feed, and return at command. This method is used nine months out of the twelve, for in the colder months it does not succeed, and is so far from a novelty, that it may be everywhere seen; but more especially about the time of cutting the rice, and gleaning the crops, when the masters of the duck-sampanes row up and down the river, according to the opportunity of procuring food, which is found in plenty at the ebb tide, on the rice plantations, as they are overflowed at high water.

Fig. 6. *Manderine Drake. Anas galericulata*, Linn. and Cuv.

This remarkable bird is "somewhat less than a Wigeon; the beak of a dull red; irides hazel; the hind part of the head and neck full of feathers, and elongated into a flattish crest; the top of the head, down the middle of the crown, of a greenish-black; between the beak and eye pale rufous; behind the eye white, passing backwards into the crest, which is of a dark glossy green; the feathers round the upper part of the neck, all round, are long and pointed, like those of a Cock, and of a dull orange colour; the lower part of the neck and upper part of the breast chestnut; at the bend of the wing are three transverse streaks of black, and two of white alternate; the scapulars are black, margined with white; the back and rump dusky-brown, glossed in some parts with blue-green; on the wings a speculum, or glossy patch of blue-green, bounded below with white; the quills dusky brown, edged near the ends with pale gray; one of the second quills much broader on one web than on the other, and curves upwards in an elegant manner, standing upright when the wing is closed; the broader web of a fine pale brownish-red, tipped with black; the under, or narrower one, dusky black; the tail pointed, of a dusky brown, fringed with blue-green; the sides of the body of a brownish cream-colour, transversely crossed with fine black lines; the feathers over the thighs barred with black and white at the ends; the lower parts of the breast and belly are white; legs orange-colour; the female is not unlike that of the Summer Duck, but has two bars of white on the wing; the breast seems more clouded with brown, and the spots on it are not of the triangular shape, as in the Summer Duck, but rounded."—*Latham.*

PLATE XCIV.—CRUSTACEA.

Fig. 1. *Cancer Facchino*, Linn. *Dorippe Facchino*, Cuv.

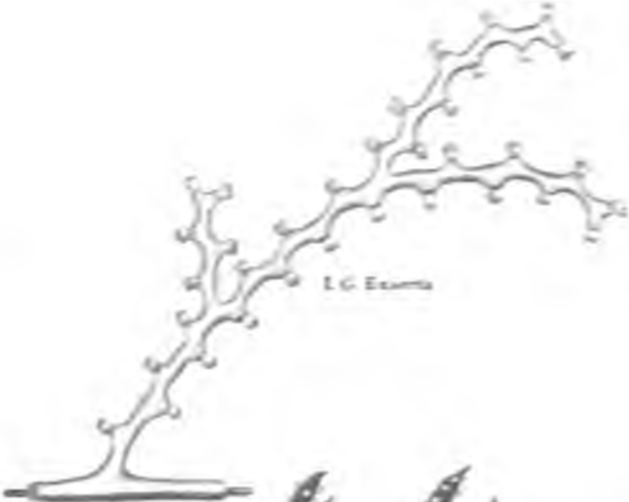
Fig. 2. *Cancer fascicularis*, Linn. and Cuv.

Fig. 3. *Cancer ruricola*, Linn. *Gecareinus ruricola*, Cuv. This is the great land crab of the Bahama islands. These animals live not only in a kind of orderly society in their retreats in the mountains, but regularly march once a year down to the sea-side, in a body of some millions at a time.

ZOOPHYTES.

GENUS of GORGONIA

Sea Fans.



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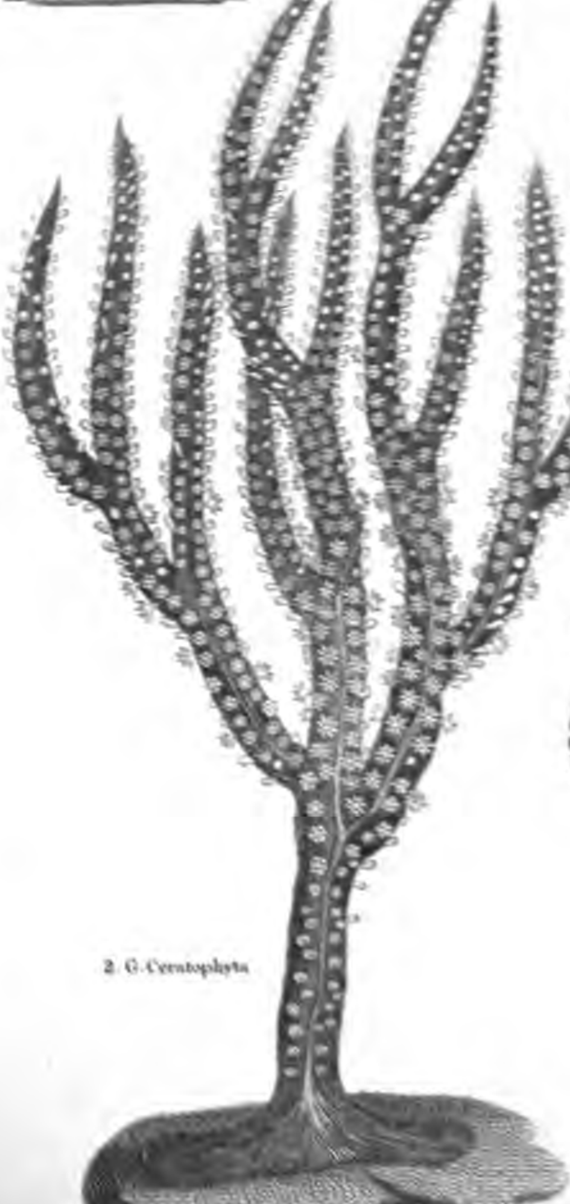

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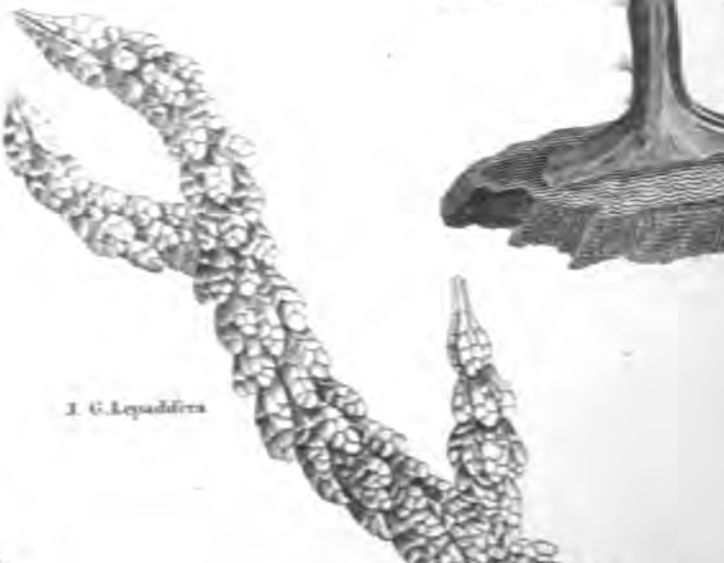
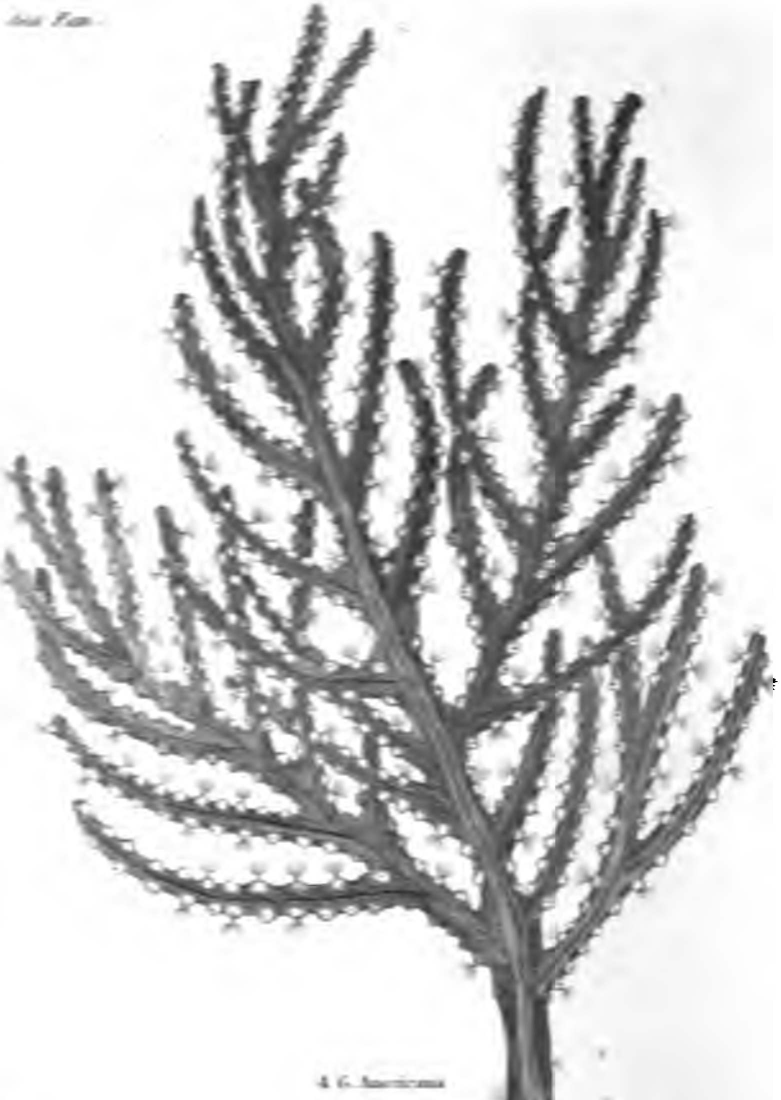


3. G. Lepadifera

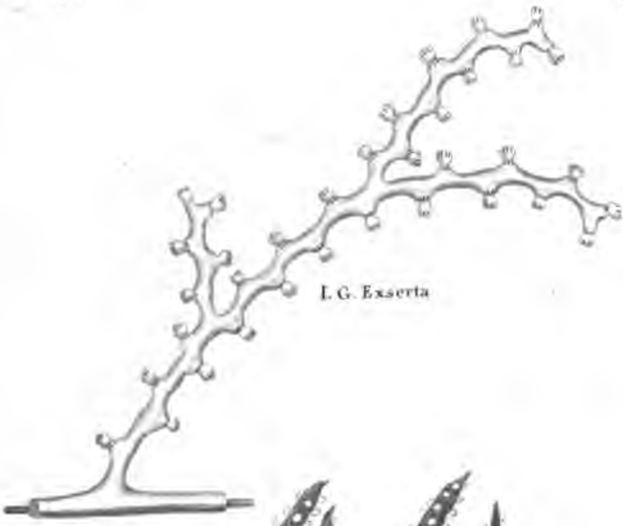


4. G. Americana

ZOOPHYTES.

GENUS *GORGONIA.*

Sea Fan.



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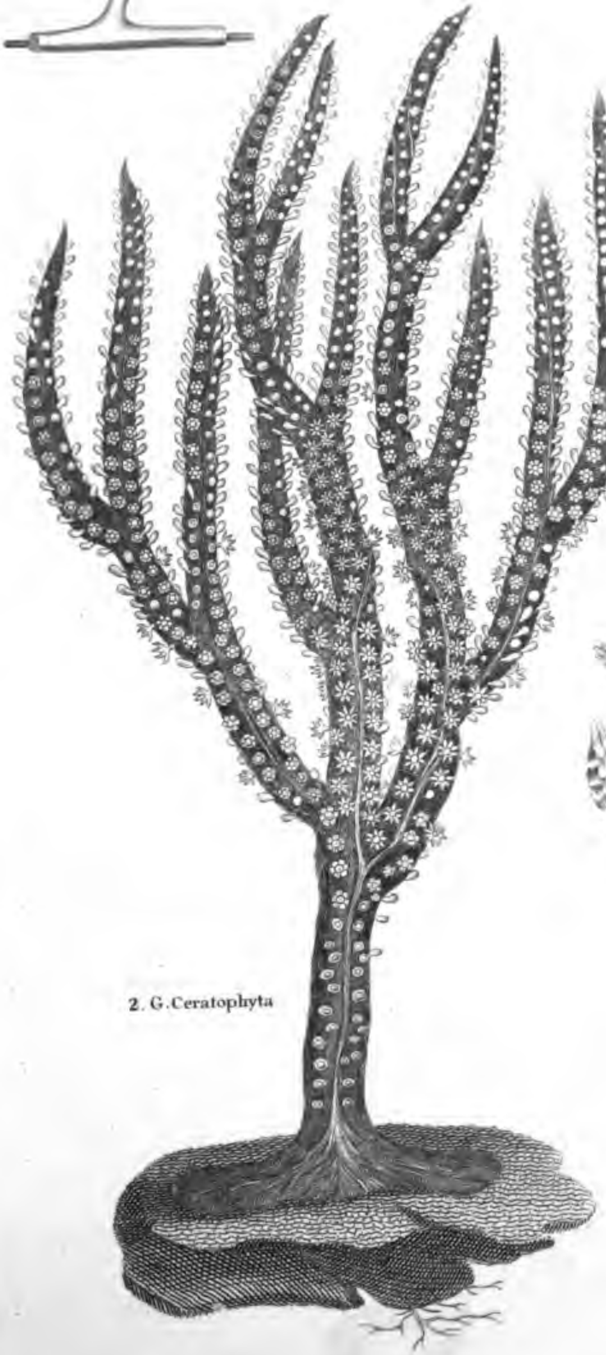
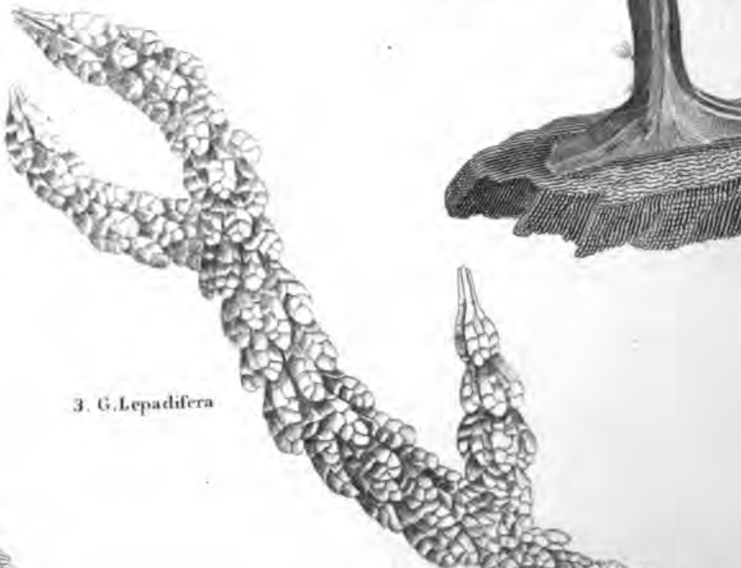
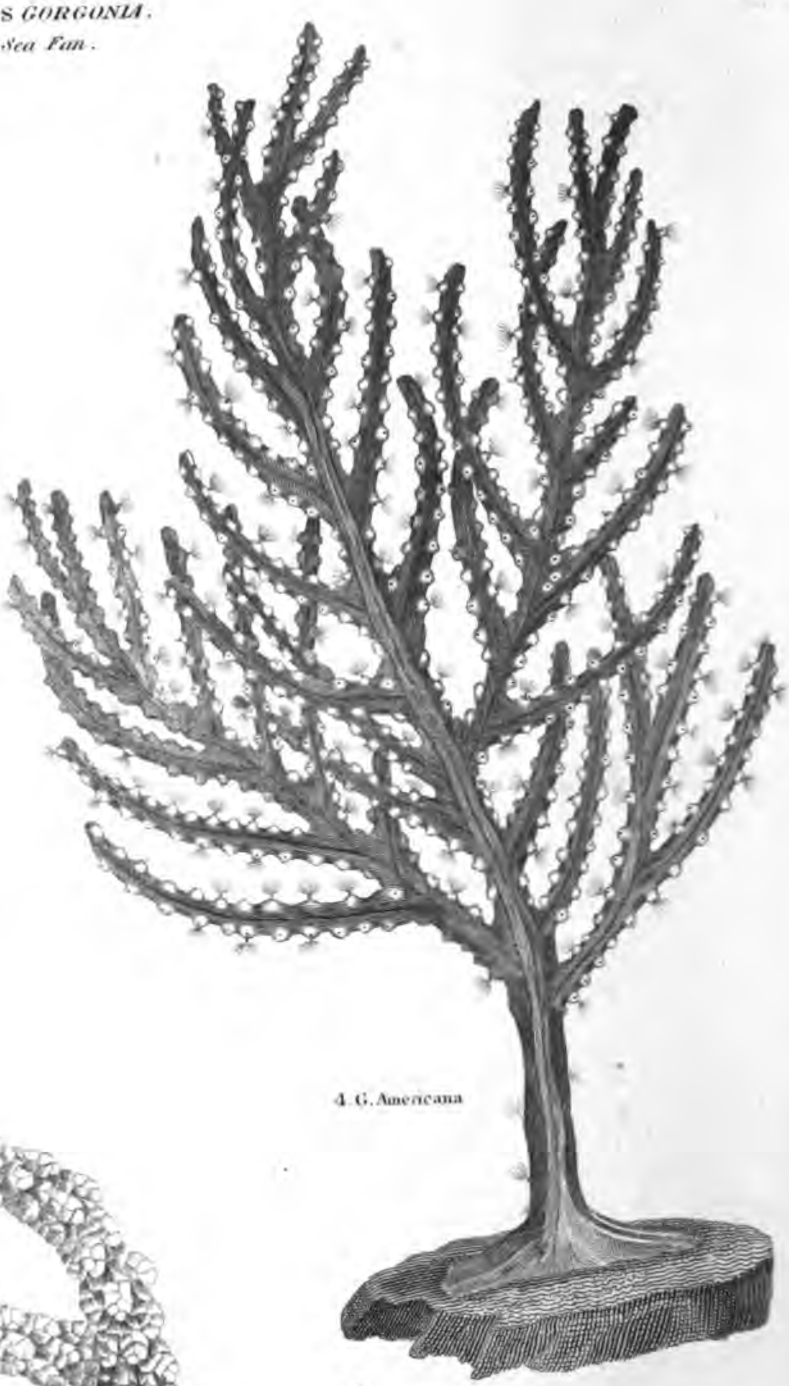


2. G. Ceratophyta



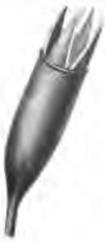
3. G. Lepadifera



4. G. Americana

BOTANY.

FRINGES of MOSSES.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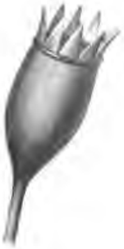
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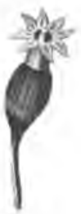
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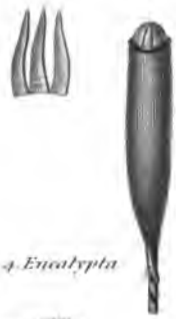
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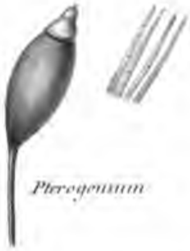
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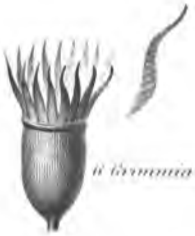
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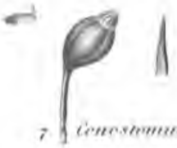
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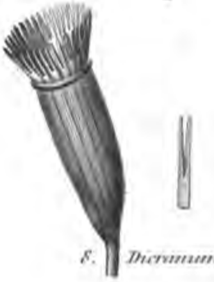
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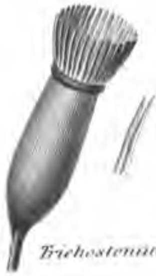
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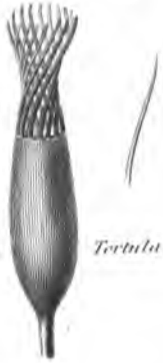
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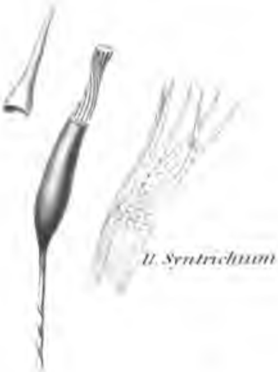
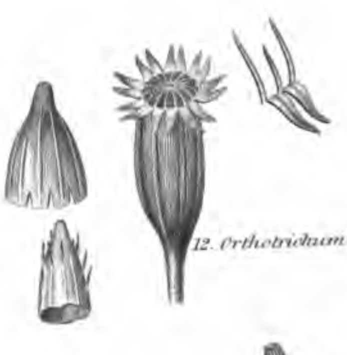

11. Syntrichum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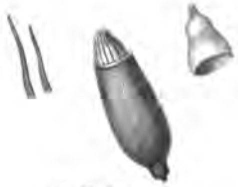
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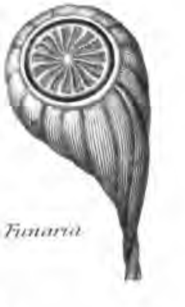
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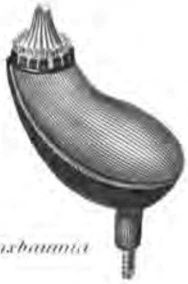
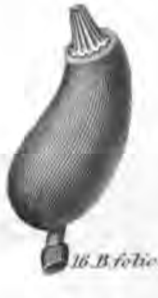
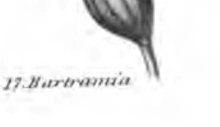
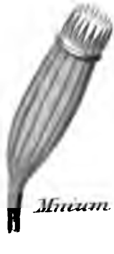
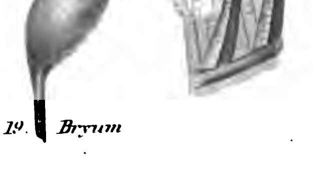

15. Buxbaumia


16. B. foliosa


17. Bartramia


18. Mnium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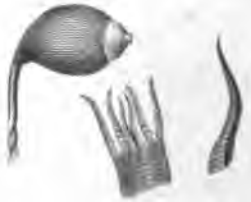
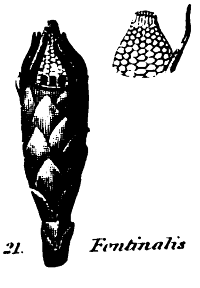
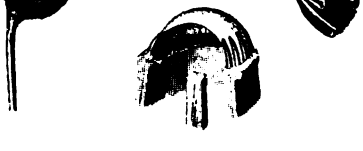

20. Hypnum


21. Fontinalis

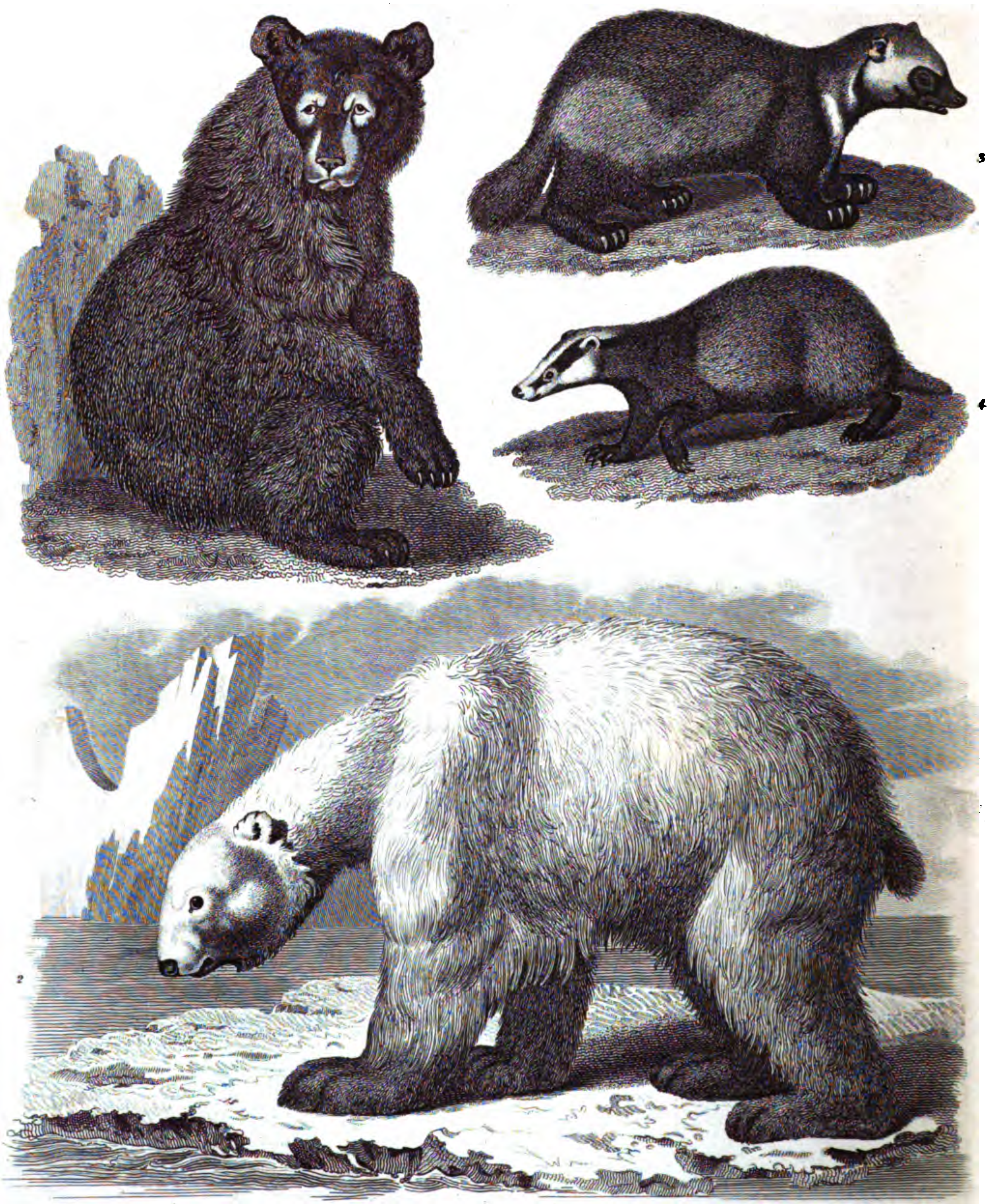
22. Polytrichum


23. Polytrichum

G. M.

QUADRUPEDS.

CLASS MAMMALIA. ORDER FERÆ GENUS URSUS.



1. U. Americanus, —— 2. U. Maritimus, —— 3. U. Gulo, —— 4. U. Meles.
American Bear. Polar Bear. Glutton. Badger.

of a ship are often perforated to the tenuity of a sponge, by these seemingly insignificant animals.

Fig. 2. *Sabella alveolata*, Linn. This is composed of numerous parallel tubes, communicating by an aperture, and forming in the mass the appearance of a honeycomb. The shell is composed chiefly of sand and particles of shells, and grows to a length of 2 or 3 inches. It inhabits the coasts of Europe.

Figs. 3 & 4. *Sabella belgica*, Linn. *Pectinaria belgica*, Lam. *Amphitrite belgica*, Cuv. The tube of this animal is nearly two inches long, and formed of variously coloured, rounded granules. Inhabits the European coasts, and is extremely fragile.

PLATE XCVIII.—ZOOPHYTES.

The genus *Gorgonia* of Linnæus embraces those zoophytes which have a stem of a woody, coriaceous, corky or horny structure, and somewhat flexible. They assume an almost infinite variety of forms, and have been much subdivided in additional genera since the time of Linnæus.

These marine productions were regarded by the ancients as a class of plants, and described as such by their botanists; nor was this idea, however remote from truth, corrected until early in the last century, by the publications of Peysonnel, who showed that the Gorgoniæ are the fabrications of minute animals which inhabit the cells. The stems and branches may be said to form the skeleton of these habitations, being covered with a fleshy or pulpy substance, the exterior surface of which is porous. These pores are the mouths or openings of the cells in which the animalculæ are lodged; and it is the number, disposition, and varied structure of these, in addition to the general aspect of the habitations, that constitute the most material differences by which the various species are distinguished.

Fig. 1. *Gorgonia exserta*, Linn. Round, with a few alternate branches. It is white and slender, and grows two feet high. Inhabits the West Indies.

Fig. 2. *Gorgonia ceratophyta*, Linn. Branched, with irregular rows of white florets. It is found in the Atlantic ocean, and in the Mediterranean.

Fig. 3. *Gorgonia lepadifera*, Linn. Dichotomous, with crowded, imbricated florets. Grows two feet high, and inhabits the seas of Norway.

Fig. 4. Branched and subdivided; the subdivisions nearly opposite; compressed, with rows of polypiferous cells on each margin. Inhabits the West Indies.

PLATE XCIX.—BOTANY.

Mosses.

The Mosses are the third of the seven families into which Linnæus has divided the vegetable kingdom. They constitute the third class in the method of Ray. In the systems of Fournefort, they constitute a single genus or family, by the name of *Muscus*, in the first section of the seventeenth class, which contains, besides the Mosses, the Mushrooms, and some of the Algous plants, or Sea-wrack. To the whole of this class the great French botanist has given the name of *Asperma*, or plants without seeds: for in the time of Fournefort the seeds of those plants had not been discovered. But the seeds of the Mosses and other plants belonging to the class Cryptogamia, have been detected by the vigilant researches of Hedwig, Gærtner, and other writers.

In the form and disposition of their leaves, in the manner of their growth, and in other circumstances, the Mosses considerably resemble the pines, firs, and other coniferous evergreens. Some of the smallest plants with which we are acquainted belong to the Mosses. Few of them attain to the height of a foot; whereas among the ferns, we have instances of species that are even arborescent. Very few of the Mosses are annual plants: the greater number are perennial and evergreen. Their growth is very slow, but they are extremely retentive of the principle of life. After having been preserved dry for a great number of years, even for a century or more, they may be made to resume their primitive verdure, simply by moistening them.

The Mosses inhabit the hottest and coldest climates. They delight, however, in a cool and moist situation, and a north exposure, where they are screened from the sun. Many of them grow upon the summits of the highest mountains where vegetation can take place. Others, however, affect more humble situations, such as the margins of rivers.

Linnæus has distinguished the genera of the Mosses principally from the presence or absence of the calyptre, which he considers as the calyx of this family of plants.

Fig. 1. *Tetraphis*, Linn. Fringe of 4 teeth; erect, firm, polished and permanent.

Fig. 2. *Octoblepharum*, Linn. Fringe of 8 teeth.

Fig. 3. *Splachnum*, Linn. Fringe of 16 teeth, dilated at base, approaching each other in pairs.

Fig. 4. *Encalypta*, Linn. Fringe of 16 linear, upright teeth; veil bell-shaped.

Fig. 5. *Pterogonium*, Linn. Fringe of 16 linear, upright teeth, capsule from a lateral sheath.

Fig. 6. *Grimmia*, Linn. Fringe of 16 equi-distant teeth, dilated at base.

Fig. 7. *Conostomum*, Linn. Fringe of 16 tapering teeth, approaching each other in pairs.

Fig. 8. *Dicranum*, Linn. Fringe of 16 flat, somewhat inflexed teeth, cloven half-way down.

Fig. 9. *Trichostomum*, Linn. Fringe of 32 linear straightish teeth.

Fig. 10. *Tortula*, Linn. Fringe of numerous linear teeth, spirally and repeatedly twisted together.

Fig. 11. *Syntrichium*, Linn. Teeth united into a cylinder at the base, pierced with numerous holes.

Fig. 12. *Orthotricium*, Linn. Outer fringe of 16 teeth, inner of 8 or 16 linear teeth, sometimes altogether deficient.

Fig. 13. *Neckera*, Linn. Outer fringe of 16 teeth, inner of 16 capillary ones.

Fig. 14. *Funaria*, Linn. Outer fringe of 16 oblique teeth, cohering at the points, inner of 16 flat teeth.

Fig. 15. *Buxbaumia*, Linn. Outer fringe of 16 very short teeth, inner membranous, plaited.

Fig. 16. *B. foliosa*. Outer fringe scarcely perceptible.

Fig. 17. *Bartramia*. Outer fringe of 16 awl-shaped teeth.

Fig. 18. *Mnium*, Linn. Outer fringe of 16 awl-shaped teeth.

Fig. 19. *Bryum*, Linn. Outer fringe of 16 teeth, dilated at the base.

Fig. 20. *Hypnum*, Linn. Outer fringe of 16 teeth, dilated at the base.

Fig. 21. *Fontinalis*, Linn. Outer fringe of 16 teeth, dilated at the base.

Fig. 22 & 23. *Polytrichum*, Linn. Outer fringe of 32 or 64 short, flat, inflexed teeth, inner a transverse, orbicular membrane, affixed to the teeth of the outer.

PLATE C.—QUADRUPEDS.

Class Mammalia. Order Feræ. Genus Ursus.

Fig. 1. *American Bear. Ursus Americanus.* Linn. and Cuv.

For the following account of this animal we are indebted to Dr. Godman.

This bear is found throughout North America, from the shores of the Arctic Sea, to its most southern extremity. That they must have existed in vast numbers throughout this great extent of country, previous to its settlement by Europeans, we may readily conceive, from the immense number of skins of this animal which are procured even at the present day. From the year 1798 to 1802, one hundred and ninety-two thousand four hundred and ninety-seven bear-skins were exported from Quebec, and in the year 1822, the Hudson's Bay company alone exported three thousand-skins of the black bear.

Captains Lewis and Clark observed black bears on the wooded portions of the Rocky Mountains, and subsequently found them on the great plains of Columbia, and in the tract of country lying between these plains and the Pacific Ocean. They are occasionally found throughout the territories of the United States, in the wooded and mountainous regions, and in unsettled districts, where their skins are of great value to the inhabitants as a substitute for blankets and other manufactured woollens.

The black bear, under ordinary circumstances, is not remarkably ferocious, nor is he in the habit of attacking man without provocation. But when wounded, he turns on the aggressor with great fury, and defends himself desperately. This disposition is more fully manifested during the coupling season, because the males are then highly excited, and are not so inert and clumsy as in the autumn, when they are exceedingly fat.

If taken when young, this bear is readily domesticated, and taught numerous tricks; we see him frequently exhibited by itinerant showmen, as a "learned" bear, though it requires a long continuance of severe and cruel discipline to bring him to this state of "improvement." In captivity they are always remarkable for the persevering manner in which they keep moving backward and forward at the extremity of their chain, thus expressing their impatience of confinement, or rather, as if solicitous to take exercise.

This feeling of the necessity for exercise is manifested in an especial manner when the animal is confined in a very small cage, where he has not room even to turn entirely round. Under such circumstances he perseveringly moves himself in every direction that his narrow limits will allow, stepping with his fore feet first to one side and then to the other, and finally, by raising and depressing his body quickly, as if jumping from the ground, he gives his whole frame a degree of exercise, which must tend to the preservation of his health and strength.

When the winters are severe at the north, and they find a difficulty of procuring food, they travel to the southern regions in considerable bodies. Dr. Libley states, in his report to the secretary of war, relative to the territory bordering on Red River, that from all the information he could gain, immense and almost incredible numbers of these animals descended the mountains, and passed southwardly into the timbered country.

The females bring forth their young in the winter time, and exhibit for them a degree of attachment which nothing can surpass. They usually have two cubs, which are suckled until they are well grown. The fondness existing between the mother and cubs seems to be mutual, and no danger can separate her from them, nor any thing, short of death itself, induce her to forsake them.

Black bears are still numerous in the wooded and thinly settled parts of Pennsylvania, as well as in most of the other states of the Union, and where their favourite food is plenteous they grow to a great size, and afford a large quantity of oil. Bartram relates that he was present at the cutting up of one which weighed five or six hundred pounds, and his hide was apparently as large as that of an ox of six or seven hundred weight.

The food of this animal is principally grapes, plums, whortleberries, persimmons, bramble and other berries; they are also particularly fond of the acorns of the live oak, on which they grow excessively fat in Florida, &c. In attempting to procure these acorns they subject themselves to great perils, for after climbing these enormous oak-trees, they push themselves along the limbs towards the extreme branches, and with their fore-paws bend the twigs within reach, thus exposing themselves to severe and even fatal accidents in case of a fall. They are also very fond of the different kinds of nuts and esculent roots, and often ramble to great distances from their dens in search of whortleberries, mulberries, and indeed all sweet flavoured and spicy fruits; birds, small quadrupeds, insects, and eggs, are also devoured by them whenever they can be obtained. They are occasionally very injurious to the frontier settlers, by their incursions in search of potatoes and young corn, both of which are favourite articles of food; their claws enable them to do great mischief in potatoe grounds, as they can dig up a large number in a very short time, and where the bears are numerous their ravages are occasionally very extensive.

In the north, the flesh of the bear is fittest for the table after the middle of July, when the berries begin to ripen, though some berries impart a very disagreeable flavour to their flesh. They remain in good condition until the following January or February; late in the spring they are much emaciated, and their flesh is dry and disagreeable in consequence of their long fasting through the season of their torpidity. Their flesh is also rendered rank and disagreeable by feeding on herring spawn, which they seek and devour with greediness, whenever it is to be obtained. The southern Indians kill great numbers of these bears at all seasons of the year, but no inducement can be offered to prevent them from singeing off the hair of all that are in good condition for eating, as the flesh of the bear is as much spoiled by skinning as pork would be; the skins these people bring the traders are consequently only such as are obtained from bears that are too poor to be eaten.

In the vicinity of Hudson's Bay the black bear has been observed to feed entirely on water-insects during the month of June, when the berries are not ripe. These insects, of different species, are found in astonishing quantities in some of the lakes, where, being driven by gales of wind in the bays, and pressed together in vast multitudes, they die, and cause an intolerable stench by their putrefaction, as they lie in some places two or three feet deep. The bear swims with his mouth open, and thus gathers the insects on the surface of the water: when the stomach of the animal is opened, at this season, it is found to be filled with them, and emits a very disagreeable stench. They are even believed to feed on those which die and are washed on shore. The flesh of the animal is spoiled by this diet, though individuals killed at a distance from the water are agreeably flavoured at the same time of year.

During the season when the logger-head turtles land in vast multitudes from the lagoons at the south, for the purpose of laying, the black bears come in droves to feast on their eggs, which they dig out of the sand very expeditiously, and they are so attentive to their business, that the turtle has seldom left the place for a quarter of an hour, before the bear arrives to feast on her eggs.

While Major Long's party were passing through the country west of the Missouri, they often saw black bears, which they observed most commonly to feed on grapes, plums, dog-wood berries, &c.; but they were also frequently seen disputing with the wolves and buzzards for a share of the carcasses of animals abandoned by the hunters, or of such as had perished by disease. When the bear seizes a living animal, he does not, as most other beasts do, first put it to death, but tears it to pieces and devours it, without being delayed by its screams or struggles, and may be actually said to swallow it alive.

The following instance occurred in the western part of the state of New-York, in the year 1824. The back window of a farm-house was forced open one night, and a considerable quantity of pork carried off. The proprietor, without suspecting the nature of the plunderer, placed a loaded musket opposite the window, having a string so adjusted that the gun would be discharged by any thing attempting to enter the room through the window. During the night the report of the gun was heard, and in the morning the body of a large black bear was found at a short distance from the spot where he had received his death-wound.

The usual residence of the black bear is in the most remote and secluded parts of the forest, where his den is either in the hollow of some decayed tree, or in a cavern formed among the rocks. To this place he retires when his hunger is appeased, and in the winter he lies coiled up there during the long period of his torpidity. The female of the black bear, during the period of gestation, which commences in the month of October, and continues for about one hundred and twelve days, leads a retired and concealed life,—for we have not a single instance on record of a pregnant bear being killed either by white men or Indians, though the mother and very young cubs are frequently destroyed. During an extremely hard winter the inhabitants of the borders of James' river, Virginia, killed several hundred bears, among which two only were females, and those not with young.

In the northern parts of this continent, the subterraneous retreats of the black bear may be readily discovered by the mist which uniformly hangs about the entrance of the den, as the animal's heat and breathing prevent the mouth of the cave from being entirely closed, however deep the snow may be. As the black bear usually retires to his winter quarters before any quantity of snow has fallen, and does not again venture abroad, if undisturbed, until the end of March or beginning of April, he must consequently spend at least four months in a state of torpidity, and without obtaining food. It is therefore not surprising that, although the bear goes into his winter quarters in a state of excessive fatness, he should come out in the spring of the year extremely emaciated.

The Indians consider this bear as one of the noblest objects of the chase, and they always manifest the highest degree of exultation when they are successful in killing one. Every part of the animal is valuable to them, even to its intestines and claws; the latter are bored at the base and strung on deer sinews to be worn as ornaments. The flesh is considered most delicious food, and the fore-paws as an exquisite dainty.

The fat of the bear is accumulated in different parts of the body to an excessive degree towards autumn, after the animal has been plentifully supplied with food; the oil obtained by liquefying it, is a well-known popular remedy against baldness, as well as for rubbing stiff or rheumatic joints. The fat obtained from the paws is most highly prized, either because it is most difficult to procure it in any quantity, or because it is really finer than that obtained from the body generally. It is very certain that few, or indeed perhaps none, of the animal oils are finer when properly prepared than that of the bear, and hence, in any case where the external application of oil is thought to be proper, bear's oil will be preferable to any other; but that it possesses many other virtues except those depending on its tenuity, we are not prepared to admit.

The black bear, like all the species of this genus, is very tenacious of life, and seldom falls unless shot through the brain or heart. An experienced hunter never advances on a bear that has fallen, without first stopping to load his rifle, as the beast frequently recovers to a considerable degree, and would then be a most dangerous adversary. The skull of the bear appears actually to be almost impenetrable, and a rifle-ball fired at a distance of ninety six yards, has been flattened against it, without appearing to do any material injury to the bone. The best place to direct blows against the bear is upon his snout; when struck elsewhere, his dense woolly coat, thick hide, and robust muscles, render manual violence almost entirely unavailing.

When the bear is merely wounded, it is very dangerous to attempt to kill him with such a weapon as a knife or tomahawk, or indeed any thing which may bring one within his reach. In this way hunters and others have paid very dearly for their rashness, and barely escaped with their lives.

The black bear, in common with other species of the genus, endeavours to suffocate an adversary by violently hugging and compressing its chest. A man might end such a struggle in a few instants, if one hand be sufficiently at liberty to grasp the throat of the animal with the thumb and fingers, externally, just at the root of the tongue, as a slight degree of compression there will generally suffice to produce a spasm of the glottis, that will soon suffocate it beyond the power of offering resistance or doing injury.

The black bear differs from other species of the genus by having the nose and forehead nearly on the same line, though the forehead is slightly prominent. This projection of the front is less at the upper part than in the brown bear of Europe. The palms of the hands and soles of the feet are very short, and the whole body is covered with long, shining, straight black hair, which is by no means harsh to the touch. The sides of the face are marked with fawn colour, and a small spot of the same exists in some individuals in front of the eye; others have the muzzle of a clear light yellow, with a white line commencing on the root of the nose and reaching to each side of the angle of the mouth. This continues over the cheek to a large white space, mixed with a slight fawn colour, covering the whole of the throat, whence a narrow line descends upon the breast. It was this variety which Geoffroy called *Ours Gulaire.* The yellow bear of Carolina is also a variety of the black or American bear. Capt. Franklin saw adults of this species in the vicinity of Cumberland-house which were red, and remarked that the cubs of these red bears were black; while the cubs of the black individuals were as frequently of a red colour.

FIG. 2. *Polar Bear. Ursus Maritimus.* LINN. and CUV.

The polar bear is an animal of much greater magnitude than any of the species which are to be found on land; for, one which was measured by Captain Lyon, in his northern expedition, was eight feet seven inches and a half in length, and weighed sixteen hundred pounds.

The shape of this species is also considerably different from that of the land bears. It seems fitted, in an eminent degree, to spend its existence in a liquid element. It is much longer in the body than the other, and its legs thicker and shorter. It also differs much in the shape of its head; when viewed in profile, the line is nearly straight, and the upper part of its cranium is rather depressed. The muzzle is broader and thicker, and the head much narrower, and more cylindrical. But one of the most remarkable characteristics of the animal is the length and thickness of the neck, it being nearly equal to the head, and almost twice as long as that of the brown bear; while the ears and mouth are extremely small. The fur is very long and thick, of a bright white beneath, and, on its upper surface, of a yellowish tinge. There is a circle of black around each eye, and the nose is also tipt with black, as well as the margins of the lips. The soles of the feet are thickly covered with hair, which gives the animal a firm footing on the ice; and the claws are short, black, and nearly straight.

Besides the difference in external character, there is a remarkable distinction between the brown and the polar bears; for the former prefers, as his abode, the wooded summits of Alpine regions, feeding principally on roots and vegetables; while the latter fixes his residence on the sea-coast, or on an iceberg, and seems to delight in the stormy and inhospitable precincts of the Arctic circle, where vegetation is scarcely known to exist, feeding entirely on animal matter. But it cannot be regarded as a predatory quadruped, for it seems to prefer dead to living animal food, its principal subsistence being the floating carcasses of whales. It also preys upon seals, which it catches with much keenness and certainty as they ascend to the surface of the ocean to breathe; and sometimes fish are caught by them, when they enter shoals or gulfs. They move with great dexterity in the water, and capture their prey with apparent ease. It is only when these bears quit their winter quarters, and especially when the female has to protect her young, that they manifest great ferocity.

Maternal Affection.—While the Carcass, one of the ships of Captain Phipps's voyage of discovery to the North Pole, was locked in the ice, early one morning the man at the mast-head gave notice, that three bears were making their way very fast over the frozen ocean, and were directing their course towards the ship. They had no doubt been invited by the scent of some blubber of a sea-horse, which the crew had killed a few days before, and which, having been set on fire, was burning on the ice at the time of their approach. They proved to be a she bear and her two cubs; but the cubs were nearly as large as the dam. They ran eagerly to the fire, and drew out from the flames part of the flesh of the sea-horse that remained unconsumed, and ate it voraciously. The crew of the ship threw great lumps of the flesh they had still left upon the ice, which the old bear fetched away singly, laying every piece before the cubs as she brought it, and, dividing it, gave each a share, reserving but a small portion to herself. As she was fetching away the last piece, they levelled their muskets at the cubs, and shot them both dead, at the same time wounding the dam in her retreat, but not mortally. It would have drawn tears of pity from any but the most unfeeling, to have marked the affectionate concern expressed by this poor animal, in the dying moments of her expiring young. Though she was sorely wounded, and could but just crawl to the place where they lay, she carried the lump of flesh she had just fetched away, as she had done the others, tore it in pieces, and laid it down before them. When she saw they refused to eat, she laid her paws first upon the one, then upon the other, and endeavoured to raise them up, making, at the same time, the most pitiable moans. Finding she could not stir them, she went off, and, when she had got to some distance, looked back, and moaned; and that not availing to entice them away, she returned, and, smelling round them, began to lick their wounds. She went off a second time, as before, and, having crawled a few paces, looked again behind her, and for some time stood moaning. But still, her cubs not rising to follow, she returned to them anew, and, with signs of inexpressible fondness, went round, pawing them successively. Finding, at last, that they were cold and lifeless, she raised her head towards the ship, and growled a curse upon the destroyers, which they returned with a volley of musket-balls. She fell between her cubs, and died licking their wounds.

Sagacious Caution.—The captain of a Greenland whaler, being anxious to procure a bear without injuring the skin, made trial of a stratagem of laying the noose of a rope in the snow, and placing a piece of kreng within it. A bear, ranging the neighbouring ice, was soon enticed to the spot by the smell of burning meat. He perceived the bait, approached, and seized it in his mouth; but his foot, at the same time, by a jerk of the rope, being entangled in the noose, he pushed it off with his paw, and deliberately retired. After having eaten the piece he had carried away with him, he returned. The noose, with another piece of kreng, having being replaced, he pushed the rope aside, and again walked triumphantly off with the bait. A third time the noose was laid; but, excited to caution by the evident observations of the bear, the sailors buried the rope beneath the snow, and laid the bait in a deep hole dug in the centre. The animal once more approached, and the sailors were assured of their success. But Bruin, more sagacious than they expected, after snuffing about the place for a few moments, scraped the snow away with his paw, threw the rope aside, and again escaped unhurt with his prize.

Ferocity manifested.—The polar bears are animals of tremendous fierceness. Brentz, in his voyage in search of the north-east passage to China, had the most horrid proofs of their ferocity in the island of Nova Zembla, where they attacked his seamen, seizing them in their mouth, carrying them off with the utmost ease, and devouring them even in sight of their comrades.

About twenty years ago, the crew of a boat, belonging to a ship in the whale fishery, shot at a bear some little distance off, and wounded him. The animal immediately set up a dreadful howl, and scampered along the ice towards the boat. Before he reached it, he had received a second wound. This increased his fury, and he presently plunged into the water, and swam to the boat; and, in his attempt to board it, he placed one of his fore paws upon the gunwale, and would have gained his point, had not one of the sailors seized a hatchet and cut it off. Even this had not the effect of damping his courage, for he followed the boat till it reached the ship, from whence several shots were fired at him, which hit, but did not mortally wound him: he approached the vessel, and ascended the deck, where, from his dreadful fury, he spread such consternation, that all the crew fled to the shrouds, and he was in the act of pursuing them thither, when an effective shot laid him dead on the deck.

FIG. 3. *The Wolverene*, or *Glutton*. *Ursus Gulo*, LINN. *Gulo Luscus*, CUV.

The wolverene is about twenty-six inches in length, from the tip of the nose to the insertion of the tail, which is eight inches long; the body is rather thick; and the fur of a deep chestnut colour on the sides; the back, legs, and face are black; the legs are strong, short, and thick, the fore ones measuring only eleven inches, and the hind ones twelve; it has five toes on each foot, armed with long sharp claws, the middle ones of the fore feet being an inch and a half in length; the soles of the feet are covered with hair.

This animal is an inhabitant of the countries bordering on the Northern Ocean, both in Europe and Asia: it is also common in Canada, as far north as Hudson's Bay.

The wolverene is rather a slow-paced animal; but its great strength, sagacity, and acute sense of smell, amply compensate this defect. It is said to be a very fierce and savage creature; but the acute Dr. Richardson says that, in this respect, accounts have been considerably exaggerated. He adds, however, that it is exceedingly troublesome to the hunters, not only greedily devouring their store of provisions, but also plundering the baits of their traps, and even the game they take in them. They frequently traverse and rob a district of some miles in extent.

This quadruped is said to live a life of endless rapine. It lurks in the branches of trees, in order to surprise deer and other animals that pass under them. The stag and rein-deer frequently become its victims. It is such an enemy to the beaver, that in America it bears the name of the beaver-eater. It is an animal of great courage, and so obstinately resolute, that it has been known to seize upon a deer which an Indian had killed, and refused to yield it up; and has frequently fallen a victim to its greed, and allowed itself to be shot, rather than render up the carcass. The great strength, and sharpness of the claws of the wolverene, make it a formidable enemy even to the wolf and bear, and it has been known to deprive the former of his prey. They are very destructive to the fox, by entering their burrows, which, if not large enough to admit them, they easily widen, by means of their strong claws, and devour both mother and cubs.

Like the badger, the wolverenes live in burrows under ground, which they dig for themselves.

Proof of Strength and Cunning.—As a proof of the surprising strength and cunning of the wolverene, there was one at Churchill, on Hudson's Bay, about twenty years since, that overset the greatest part of a pile of wood, which measured upwards of seventy yards round, and contained a whole winter's firing, to get at some provisions that had been hidden there by the Company's servants when going to the factory to spend the Christmas holidays.

FIG. 4. *Badger*. *Ursus Meles*, LINN. *Meles Vulgaris*, CUV.

The ordinary length of the badger is about two feet and a half, and of the tail six inches. The body and legs are thick, the latter being very short; the claws of the fore feet long, strong,

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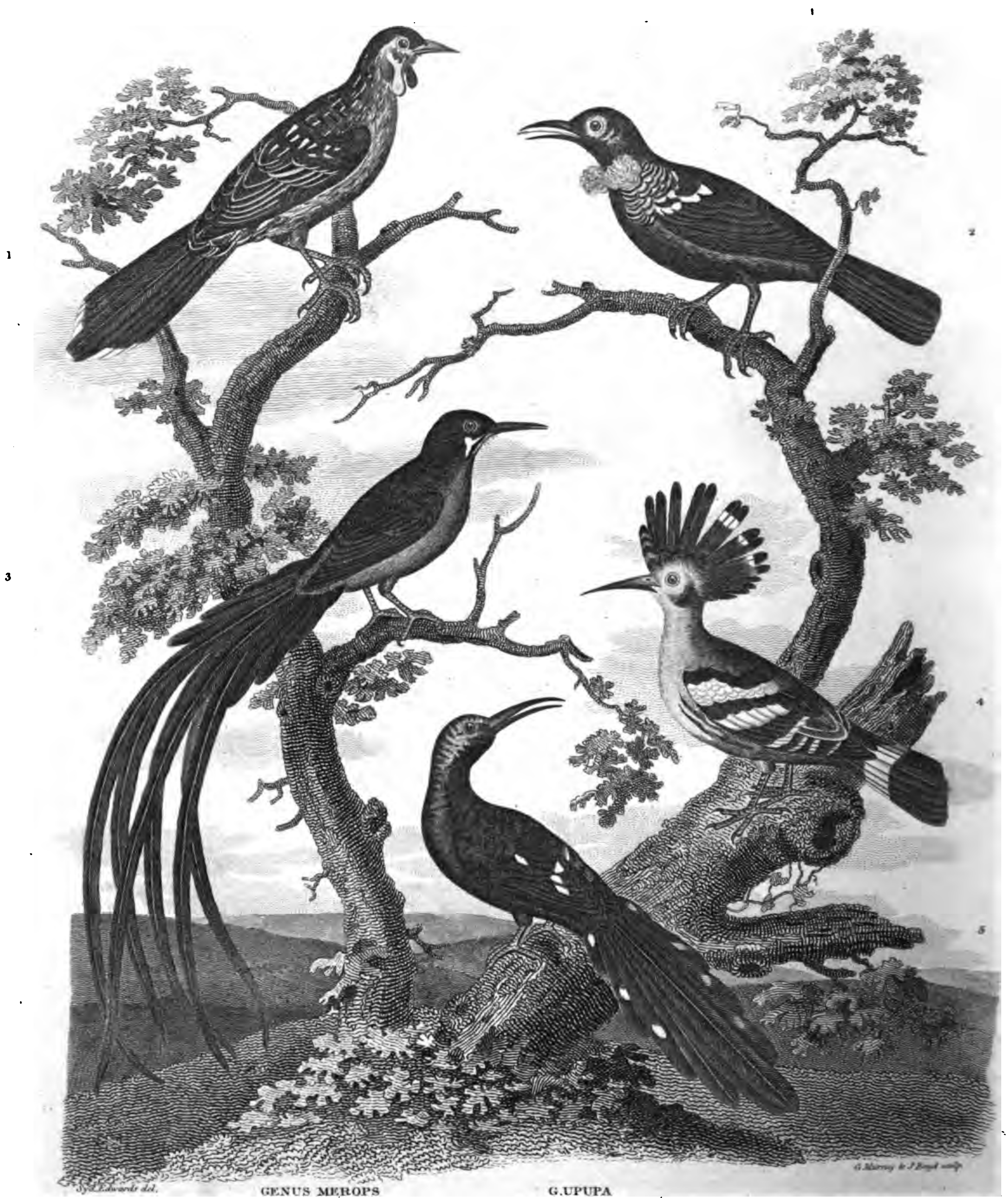
ORNITHOLOGY.

Div.1st *Land Birds*. Order 2^d PICÆ.

PLATE 101.



Sydᵃ Edwards del.

G. Murray & J. Boyd sculp.

GENUS MEROPS
(Bee Eater)

G.UPUPA
(Hoopoe)

1. M. *Carunculatus.*	2. M. *Novæ Zelandiæ.*	3. U. *Promerops.*	4. U. *Epops.*	5. U. *Erythrorynchos.*
WATTLED. B.E.	*NEW ZEALAND. B.E.*	*CAPE. H.*	*COMMON. H.*	*RED BILLED H.*

and straight, which fit it for burrowing. The ears and eyes are small,—the latter placed in a black stripe, which begins behind the ears, and runs tapering to the nose; the muzzle pointed; the colour of the skin is uniform gray on the back, sides, and tail; the lower parts and limbs entirely black; the hair is of a coarse and bristly texture,—painters' brushes are made of it.

In walking, the badger treads on its heel, like the bear; and, being so low on its legs, the belly nearly touches the ground.

The skin of the badger is dressed with the hair on, and manufactured into pistol-cases. Its flesh is eaten, and the hind quarters frequently converted into hams, which some consider superior in their flavour to bacon.

Although the badger, by nature, is furnished with formidable weapons of offence, and possesses great strength, yet it is harmless and inoffensive, and never uses these but when acting on the defensive, for it is never known to assail another animal.

The principal food of the badger is roots, fruits, grass, insects, and frogs. It sleeps during day in its burrow, which is always formed in some sequestered place.

Few creatures, when captured by man, are subjected to such cruel and barbarous treatment, for it is kept only to be baited by dogs. In this savage sport, the unfortunate brute is sometimes tormented and torn from morning to night. Humanity shudders at such cruelty; and it is only to be wondered, that, in the present enlightened age, there are to be met with men brutal enough to take pleasure in such sport, and that the laws should permit it. With a harmless nature, few animals can defend themselves with such obstinacy, or inflict keener wounds on their adversaries; and it is only a dog of great courage and strength that can draw one from its hole. The thickness of its skin, which is loose, enables it easily to turn round upon its assailants, and wound them in the tenderest parts. In this manner, being singularly endowed by nature, this animal is able to resist repeated attacks, both of men and dogs, from all quarters, till, being overpowered with numbers, and enfeebled by wounds, it is at last obliged to submit.

Badgers live in pairs, and produce, in the spring of the year, from four to five young ones.

Instance of extraordinary Affection.—The following circumstance was related by a gentleman residing at Chateau-de-Vernours.

Two persons were on a journey, and passing through a hollow way, a dog, which was with them, started a badger, which he attacked, and pursued till he took shelter in a burrow under a tree. With some pains, he was hunted out, and killed. Being a few miles from a village, called Chapellatiere, they agreed to drag him thither, as the commune gave a reward for every one which was destroyed; besides, they proposed selling the skin, as badgers' hair furnishes excellent brushes for painters. Not having a rope, they twisted some twigs, and drew him along the road by turns. They had not proceeded far, when they heard the cry of an animal in seeming distress, and stopped to listen whence it proceeded, when another badger approached them slowly. They at first threw stones at it; notwithstanding which, it drew near, came up to the dead animal, began to lick it, and continued its mournful cry. The men, surprised at this, desisted from offering any farther injury to it, and again drew the dead one along as before; when the living badger, determined not to quit its dead companion, lay down on it, taking it gently by one ear, and in that manner was drawn into the midst of the village; nor could dogs, boys, or men induce it to quit its situation by any means; and, to their shame be it said, they had the inhumanity to kill the poor animal, and afterwards to burn it, declaring it could be no other than a witch.

The American Badger is only found in the western territories of the United States. It has a longer tail than the European, and is lighter in weight, rarely exceeding from fourteen to eighteen pounds.

PLATE CI.—ORNITHOLOGY.

Order Picae. Genus Merops. Genus Upupa.

Fig. 1. *Wattled Bee-Eater. Merops Carunculatis*, Linn. *Philedon Carunculatis*. Cuv.

Measuring about fourteen inches: the feathers on the upper part of the head are somewhat longer than the rest, giving the appearance of a slight crest: the plumage of the bird is brown, the feathers long and pointed, and each feather has a white longitudinal middle streak: beneath the eye on each side the head, beyond the base of the lower mandible, is a lengthened pendent wattle of an orange-colour: the middle of the belly is yellow: the tail wedge-shaped, like that of a Magpie, and the feathers tipped with white: the bill and legs are brown. In some individuals a silvery streak appears beyond each side of the bill, and in the young birds the white streaks on the plumage terminate in a kind of dilated spot at the tip of each feather. Native of New-Holland; described and figured in White's Voyage to New South Wales.

Fig. 2. *New Zealand Bee-Eater. Merops Novae Zelandiae*, Linn. *Philedon Nov Zelandiae*, Cuv.

This most elegant species is a native of New-Zealand, and of some of the scattered islands in the South Seas. Its size is that of a Blackbird, and its length about eleven inches: the general colour of the whole bird is glossy greenish black, but the rump is glossed with rich deep blue, and strong varying glosses of green accompany the general plumage of the back and wings: the larger wing-coverts are white, forming a bar of white across the wings: the feathers of the neck are of a loose silky texture, and of a lengthened shape, curving slightly upwards at the tips: each is also marked down the middle by a whitish streak; but the principal mark of distinction in this elegant bird is a moderately large and lengthened pendent tuft of broadish white feathers, curving upwards at the tips, and situated on each side the neck beneath the ears: the bill is slightly curved, and of a black colour, as are also the legs. This bird is greatly valued by the natives of the Southern islands; its glossy plumage often contributing to the ornaments of the feathered mantles worn by the chiefs and persons of distinction. In the British Museum is a mantle of this kind, appearing to be wholly composed of the feathers of this bird, which is esteemed not less for its song than its plumage, having, according to our late voyagers, a remarkably sweet note: they also add, that it is a delicious food, and may be considered as the greatest luxury afforded by the woods of New-Zealand.

Fig. 3. *Cape Hoopoe. Upupa Promerops*. Linn. *Promerops Capensis*. Cuv.

Length about seventeen inches: size that of a lark: colour rufous brown, somewhat deeper on the wings and tail: forehead whitish, and covered with narrow feathers: throat white, with a narrow, longitudinal, dusky streak on each side: under part of the abdomen whitish, dashed with dusky streaks: vent yellow: tail very strongly cuneated, as in the Striped Promerops: bill about an inch and a half long, and of a black colour, as are also the legs. In some, probably the males, the breast, as well as the abdomen, is spotted, and the wings are crossed by a narrow gray or whitish stripe. Native of Africa, and said to be a very common bird about the Cape of Good Hope.

Fig. 4. *Common Hoopoe. Upupa Epops*. Linn. and Cuv.

This elegant bird appears to be a pretty general inhabitant of the warmer and temperate parts of the Old Continent, migrating occasionally, at different seasons, in different directions. In England it is much more rarely seen than in other northern climates. Its size is that of a common Thrush: the colour of the head, neck, and body is pale ferruginous or cinnamon-brown; darkest on the back and shoulders: the wings and tail are black, the former crossed by five white bars, the latter crossed in the middle by a white crescent, the horns pointing towards the end: the rump and lower part of the abdomen are white, and the sides of the body generally marked by a few longitudinal dusky streaks: on the head is a most elegant crest, composed of numerous lengthened feathers of different proportions, and disposed in a double longitudinal series: this it can either erect and expand, or depress and close at pleasure: the feathers composing it are cinnamon-coloured, with black tips, a white bar separating the tip from the rest of the feather: the crest is usually carried in a flat or recumbent state, and is raised only on surprise, or at particular intervals: the general length of the largest feathers is about two inches: the bill is long, slender, slightly curved, sharp-pointed, and black, with the base of the lower mandible flesh-coloured: the legs short and blackish. The Hoopoe migrates during the spring season from Africa into various parts of Europe, and again returns in winter. This migration however, is not universal, since it is observed that great numbers of these birds are constantly found about many towns and villages in various parts of Egypt, where they may be considered as nearly domesticated; building and breeding even among the houses. The flesh of these domestic Hoopoes is rank and uneatable, but that of the migrating birds is considered in many parts of Europe as an agreeable food, particularly in Italy, the south of France, and in the Grecian islands. The nest, or rather hole of the Hoopoe is generally said to have a peculiarly fetid smell: sometimes, however, it is said to be strewed with moss, wool, dry leaves, &c. and to have no disagreeable scent. Sometimes the bird breeds in the hole of a wall, but more generally in the hollow of a tree; seldom higher than about ten feet from the ground; and instances have been known in which the eggs have been placed on the ground, or among the roots of old trees. The number of eggs is from five to seven, and their colour a bluish white, speckled with brown. The disagreeable smell proceeding from the nest or hole of the Hoopoe is supposed to be chiefly owing to the remains of various kinds of insects, with which it is generally crowded, and among which the young are as it were embedded.

In Egypt the wild or migrating Hoopoes are never observed to associate with those of the towns, but frequent remote and solitary places. Those which make their appearance in Europe are generally of this disposition; but in Africa they associate in great numbers.

The ordinary food of the Hoopoe consists of various kinds of insects and worms, and hence, as Buffon observes, "It usually haunts wet grounds, where its long and slender bill can easily penetrate; and hence in Egypt it follows the retreat of the Nile; for in proportion as the waters subside, the plains are left covered by a coat of slime, swarming with immense numbers of insects; and accordingly the wild or migratory Hoopoes are fat, and a delicious food, while those which frequent the city of Cairo where they breed in full security on the house-tops, are uneatable. It is indeed easy to conceive that such as live in the plains must be better food than those which frequent the streets or environs of a large city; the former subsisting on the insects inhabiting the ground, while the latter prowl among all kinds of filth; a circumstance which cannot fail to communicate an offensive odour to their flesh."

The flight of the Hoopoe is observed to be rather slow and undulating than strong and rapid, and the bird is generally seen on the surface of the ground, being very rarely observed to perch on trees.

Fig. 5 *Red billed Hoopoe. Upupa Erythrorynchos.* Linn. and Cuv.

This highly elegant species is an inhabitant of Africa, and seems to have been first described by Dr. Latham from a specimen in the collection of the Duchess of Portland. Its size is that of a Hoopoe, and its length about fifteen inches: its colour is black, with varying glosses of red, violet, and golden green; the red cast predominates on the head, the golden green on the wing-coverts, and the violet on the back and tail: the latter is very long, and of a strongly cuneated shape, the shortest or outside feathers measuring about three inches in length, and the rest gradually lengthening to the two middlemost, which measure about eight inches: all the tail-feathers except the two middle ones, are marked near the tip by an oval white spot on each side the web: the six first quill-feathers of the wings have also a white spot on the inner web near the tip: the bill is rather long, slender, moderately curved, and of a red or orange-colour, as are likewise the legs, which are rather short in proportion to the bird.

PLATE CII.—ORNITHOLOGY.

Order Grallae. Genus Recurvirostra. Genus Haematopus. Genus Glarcola. Genus Fulica.

Fig. 1. *American Avocet. Recurvirostra Americana,* Linn. and Cuv.

This is rather larger than the European species, but equally elegant in its form: its beak is black: the forehead dusky white: the head, neck, and upper part of the breast are of a deep rufous white, palest on the throat and fore part of the neck: the lower parts of the neck behind are white: the back is black: greater and lesser wing-coverts, the outer parts of the wing and the quills are black: the middle coverts, and some of the secondaries are white, and of the latter a few are tinged with ash-colour: the under parts of the body from the breast are pure white: the legs are dusky. Inhabits North America.

Fig. 2. *Oyster-Catcher. Haematopus Ostralegus,* Linn. and Cuv.

This species has the head, neck, upper part of the breast, back, wings, and tip of the tail, of a deep black: the rump, base of the tail and of the quills, a transverse stripe on the wings, and the whole of the under parts of the body, of a pure white: the beak and circle round the eyes of a bright orange: the irides crimson: the feet fine red: the female similar. The young have the plumage shaded and bordered with brown in those parts that are black in the adult: the white is of a dirty hue: the beak and circle round the eyes are dusky brown: the irides are brown, and the feet gray, and before the autumnal or second moult the beak becomes spotted with black.

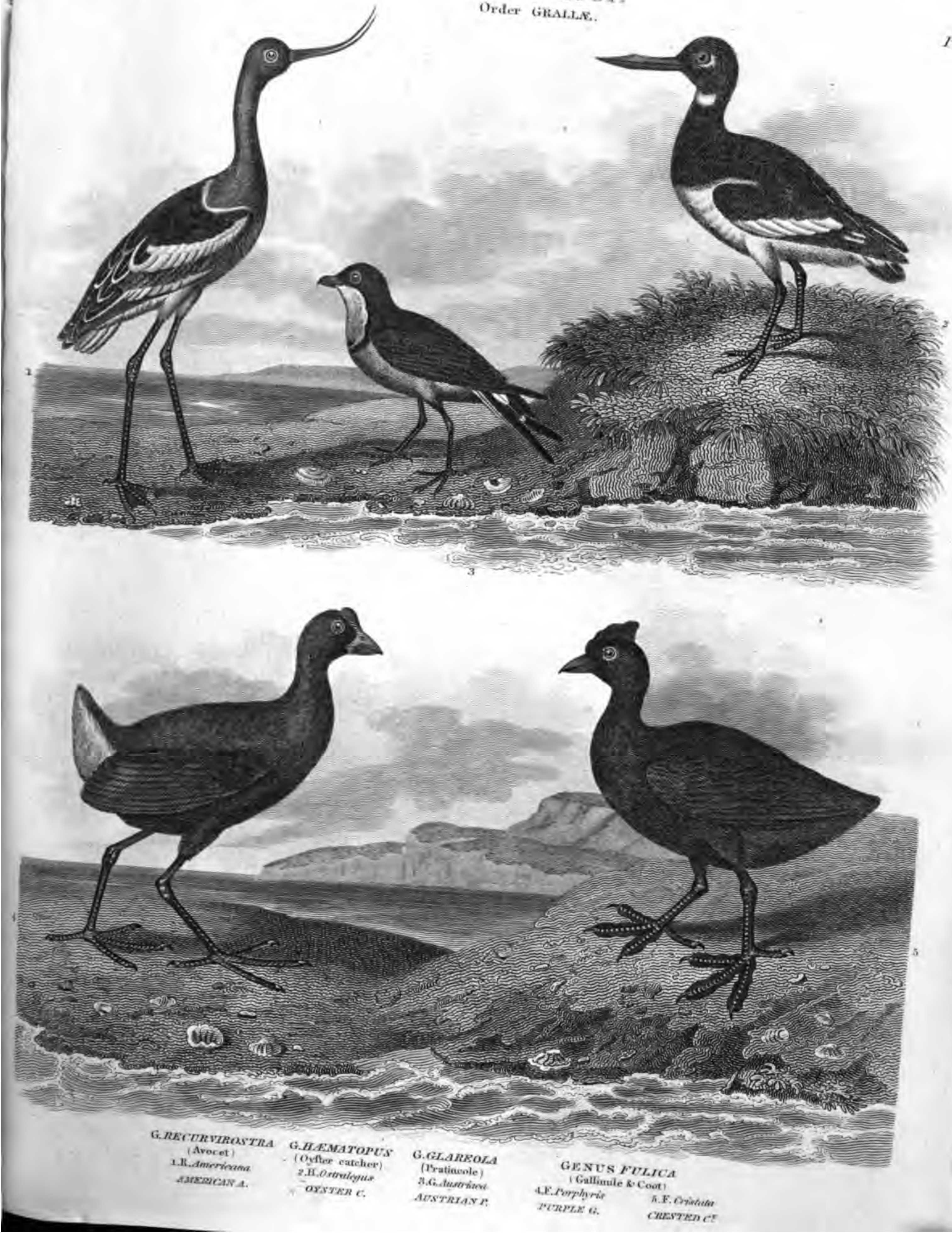
It varies occasionally in having a white streak beneath the eyes, and a transverse one on the throat; it also occurs mottled with black and white, and of a pure white, but this last is of rare appearance.

Oyster-catchers abound on the coasts of England, and are in the greatest profusion towards the west: they feed on limpets and oysters, and from their dexterity in procuring the latter their name is derived: on observing one of them which gapes wide enough to insert its beak, it thrusts it in and thus takes out the inhabitant. It does not construct any nest, but deposits its eggs on the bare ground, above high-water mark; they are generally four in number, of an olivaceous brown, blotched with black, and are arranged in the form of a square, with the small ends inward, thus giving the greatest security and warmth to each. The young are hatched in about three weeks, and are said to be capable of running as soon as they quit the eggs, and are immediately led by the parents to their proper food. During the period of incubation the male is very watchful, and upon the least alarm utters a loud scream and flies off, as does also the female, after running some distance from the place where the eggs are deposited. In the winter they often associate in considerable flocks, and are very wild; but if taken young may be easily reared, and will frequent the ponds and ditches during the day, keeping in company with domestic poultry. They are abundant throughout all the coasts of Europe, and occur on many of those of Asia and America.

ORNITHOLOGY.

Order GRALLÆ.

PLATE I



G. RECURVIROSTRA
(Avocet)
1. R. *Americana*
AMERICAN A.

G. HÆMATOPUS
(Oyſter catcher)
2. H. *Ostralegus*
OYSTER C.

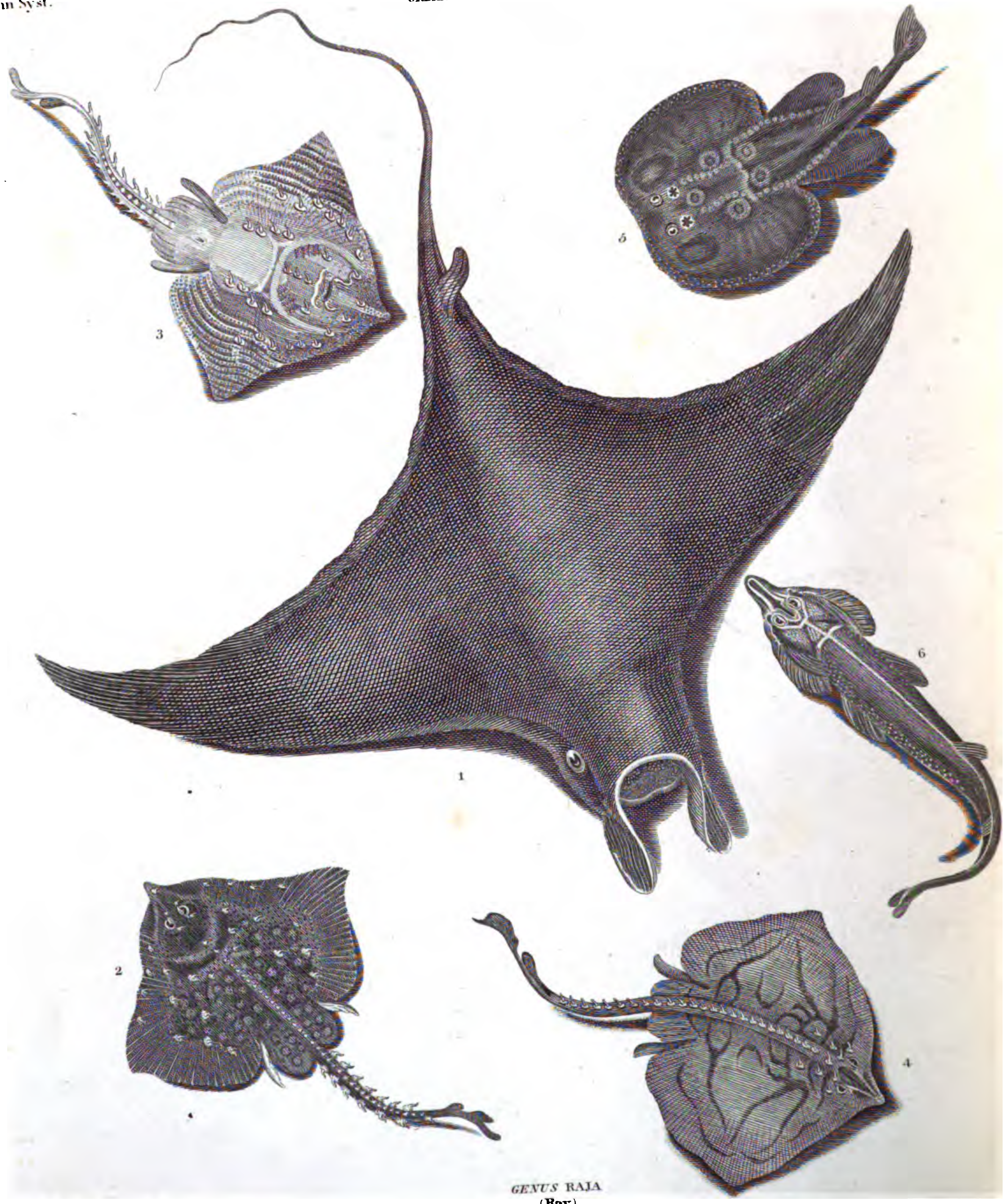
G. GLAREOLA
(Pratincole)
3. G. *Austriaca*
AUSTRIAN P.

GENUS FULICA
(Gallinule & Coot)
4. F. *Porphyris*
PURPLE G.
5. F. *Cristata*
CRESTED C^{t}

Linn Syst.

ICHTHYOLOGY.

ORDER CHONDROPTERYGII.



GENUS RAJA
(Ray)

1 R. *diabolus*.
DÆMON R.

2 R. *clavata*.
THORNBACK. 3 under surface.

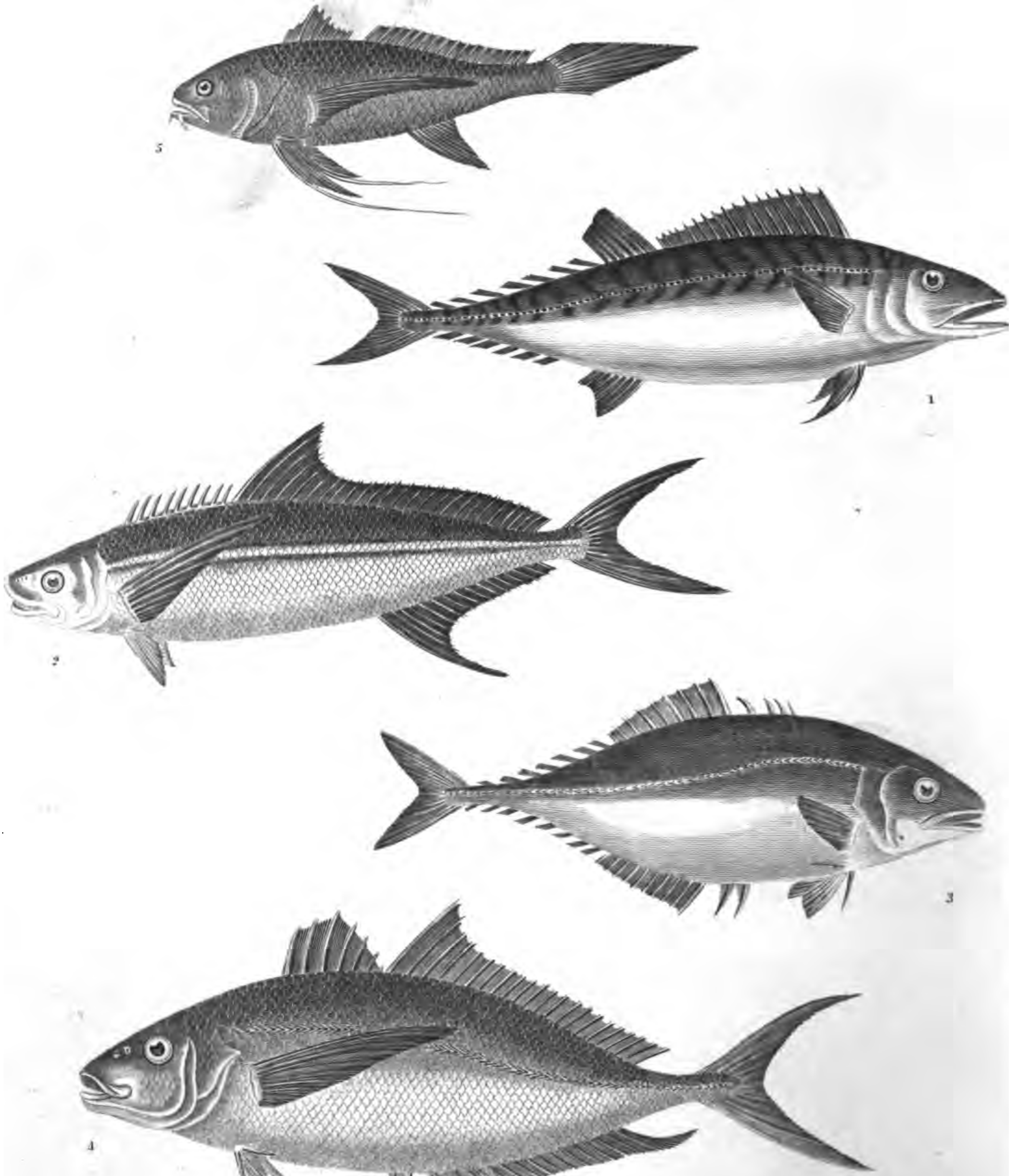
4 R. *andulata*.
UNDULATED R.

5 R. *torpedo*.
ELECTRIC. R.

6 R. *rhinobatos*.
LONG NOSED R.

Linn. Syſt. **ICHTHYOLOGY.** *PLATE 104.*

ORDER THORACICI.



GENUS *SCOMBER* G. *LONCHIURUS*

Mackerel.

1.S. *Sarda* 2.S. *Niger* 3.S. *Saliens* 4.S. *Ruber* 5.L. *Barbatus*

FIG. 3. ***Pratincole. Glareola Austriaca,*** LINN. and CUV.

This variable bird is the size of a Blackbird, being in length about ten inches: beak short and black; the base of the under mandible and corners of the mouth bright red: upper parts of the plumage gray brown; the crown and the back of the neck with a rufous tinge; the back and scapulars with a slight green bronzed reflection: wings very long, with their primary quills dusky brown; the secondaries paler, tipped with white; the tertials and coverts like the scapulars: under parts of the body, rump, and tail-coverts, white: throat and lower part of the breast yellowish: from the lower part of the eye, passing beneath the throat, is a black line: under parts of the neck, and upper parts of the breast, rufous brown: under wing-coverts bright rust-colour and black: feathers of the sides rust-coloured: tail greatly forked, and tipped with gray on the inner webs, the outer web of the exterior feathers white: legs and feet rufous brown: claws dusky.

This bird appears to be pretty generally diffused, being found throughout the greatest part of the old continent, and is most abundant in the deserts towards the Caspian Sea, appearing in great flocks: it is not uncommon in Germany, where it frequents the borders of the Rhine near Strasburgh, and lives on worms and aquatic insects; it is also occasionally seen in France, and is said to have been once taken near Liverpool, and likewise in the Isle of Unst, by Mr. Bullock, whereas it has never been observed on the continent to go far beyond the 53d degree to the north: this bird lays seven oblong eggs, and is a restless noisy species.

FIG. 4. ***Purple Gallinule. Fulica porphyris,*** LINN. ***Porphyris hyacinthicus,*** CUV.

A highly elegant and beautiful bird: its length is scarcely eighteen inches: its beak is deep red: its irides are fulvous: the bare space of the forehead is red: the head and hind part of the neck are glossy violet: its back, rump, and scapulars are dull glossy green: quills the same, with their inner margins brown: its cheeks, throat, fore part of the neck, and under part of the body, violet-blue: tail dull green, and rounded in shape: legs very stout and deep red. The female is similar in colour, but smaller.

Native of most of the warm countries of the old world. It is found in abundance in southern Africa, the island of Madagascar, and the Isle of France; likewise in the East Indies and the adjacent islands. It is frequently kept in the parks of the south of France, on account of its beauty: a pair kept in an aviary in that country made a nest of small sticks, mixed with straw; and the female laid six white eggs, perfectly round. The manners of these birds are very gentle, and they are said to be easily tamed: they feed principally on small fish; but will also devour fruit, seeds, the roots of plants, and grain. Their flesh is said to be excellent.

FIG. 5. ***Crested Coot. Fulica Cristata,*** LINN. and CUV.

A very singular species, inhabiting Madagascar: it is larger than the Common Coot, measuring eighteen inches in length: its beak is red at the base, and whitish towards the tip: the crown of the head is bare, of a deep red, and rising into a bifid, detached, crest-like membrane: the entire plumage is blue-black: its legs are dusky, with a ring or garter above the knee of these colours, viz. red, green, and yellow.

PLATE CIII.—ICHTHYOLOGY.

The Rays are recognized by the horizontally flattened body, which resembles a disc, from its union with the extremely broad and fleshy pectorals, which are joined to each other before, or to the snout, and which extend behind the two sides of the abdomen as far as the base of the ventrals. The eyes and spiracles are seated on the dorsal surface; the mouth, nostrils, and orifices of the branchiæ on the opposite one.

FIG. 1. ***Raja diabolus.*** LINN. ***Cephaloptera vulgaris,*** CUV.

Tail slender, the spine small, dorsal and pectorals broad, teeth tenuous and finely serrated. The anterior part of the head is truncated, and the pectorals instead of clasping it have each of their anterior extremities extended into a salient point, which gives the fish the appearance of having horns. Back black, bordered with violet. A gigantic species. Inhabits the Mediterranean.

FIGS. 2 & 3. ***Raja clavata.*** LINN. and CUV.

Distinguished by its roughness, and the thick, oval, bony tubercles, each of which is furnished with a recurved spine, that are irregularly scattered over its two surfaces. Inhabits the seas of Europe.

FIG. 4. ***Raja undulata.*** LINN. and CUV.

FIG. 5. ***Raja torpedo.*** LINN. ***Torpedo vulgaris.*** CUV.

Tail short, but tolerably fleshy; disc of the body nearly circular. The space between the pectorals, head and branchiæ is filled on each side with a singular apparatus formed of little membranous tubes placed close together like a honey-comb, subdivided by horizontal diaphragms into small cells filled with a sort of mucus, and traversed by numerous nerves. It is in this apparatus that resides the electric or galvanic power, which has rendered the Torpedo so celebrated; violent shocks are experienced by touching it, and it is most probable that the same power is employed to bewilder its prey. The body is smooth and irregularly marked with circular spots. Teeth small and sharp. Inhabits the seas of Europe.

FIG. 6. ***Raja rhinobatos,*** LINN. ***Rhinobatos vulgaris,*** CUV.

This species has a thick, fleshy tail, furnished with two very distinct dorsals, and a caudal; the rhomboid formed by its snout and pectorals is acute in front, and narrower in proportion than in ordinary rays. Independently of this, it has all the characters of the latter genus: its teeth are crowded and planted like small flat paving-stones. Inhabits the Mediterranean.

PLATE CIV.—ICHTHYOLOGY.

Mackerel.

The Mackerels have a fusiform body, covered with uniformly small and smooth scales; two little cutaneous crests on the sides of the tail; the first dorsal extends close to the second.

FIG. 1. ***Scomber sarda.*** LINN. ***Sarda vulgaris.*** CUV.

This species is common in the Black Sea and Mediterranean. It is blue, the back obliquely streaked with blackish; remarkable for the extreme length of its gall-bladder. It also inhabits both oceans.

FIG. 2. ***Scomber niger,*** LINN. ***Centronotus niger,*** CUV.

Black, belly white: measures frequently 8 or 9 feet in length. Found in Brazil.

FIG. 3. ***Scomber Saliens.*** LINN. and CUV.

Inhabits the Mediterranean.

FIG. 4. ***Scomber ruber,*** LINN. ***Caranx ruber,*** CUV.

Inhabits the seas of Europe. Resembles the true Mackerel in form and flavour, and is remarkable for the bands or plates, which cover its lateral line, commencing from the shoulder.

FIG. 5. ***Lonchurus barbatus.*** LINN. and CUV.

Brown, with two cirri under the chin, about ten inches long. Inhabits the rivers of Surinam.

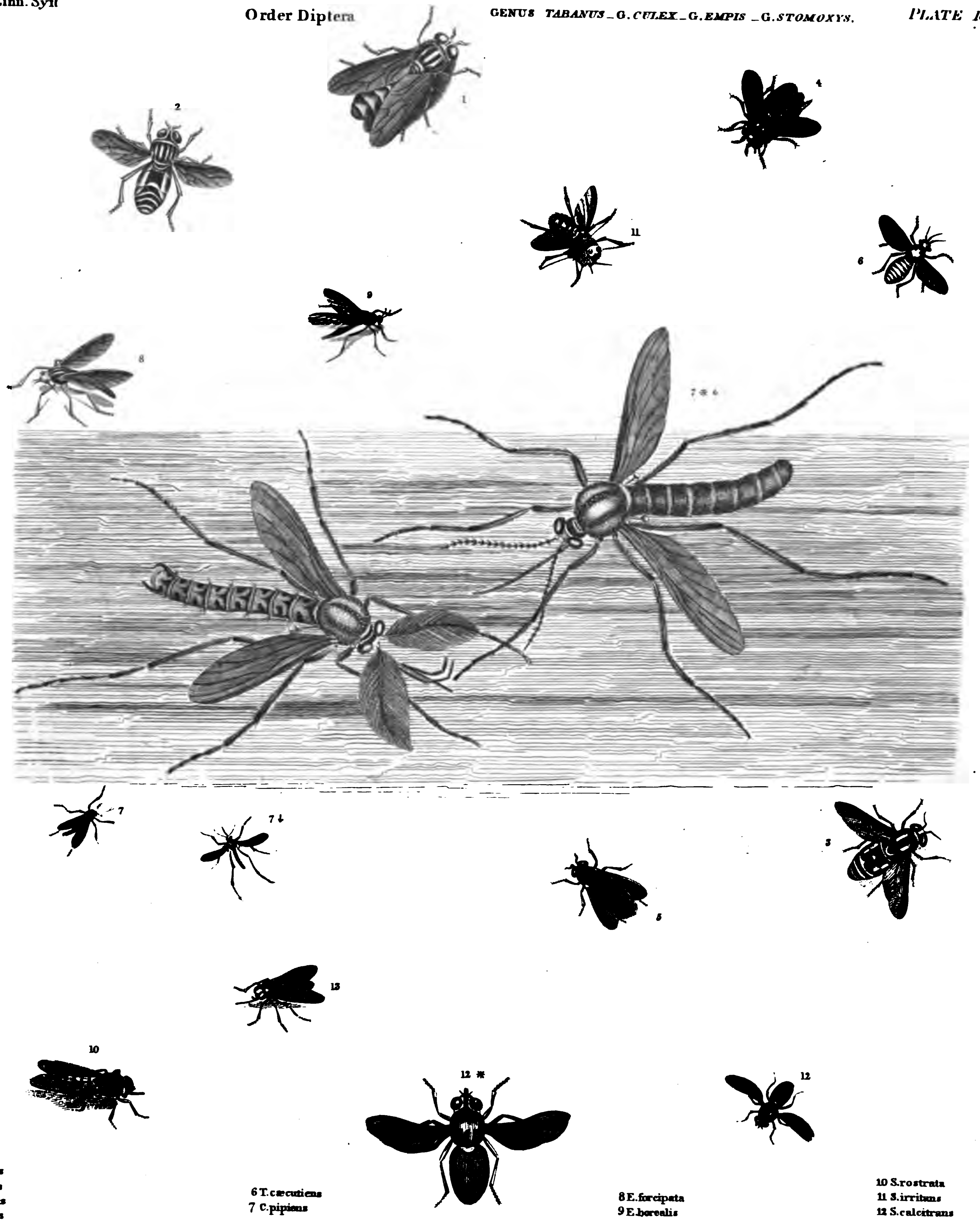
Linn. Syſt

ENTOMOLOGY

Order Diptera

GENUS *TABANUS* _ G. *CULEX* _ G. *EMPIS* _ G. *STOMOXYS*.

PLATE 106.



1 T.bovinus
2 T.tropicus
3 T.bromius
4 T.pluvialis
5 T.rusticus

6 T.cæcutiens
7 C.pipiens

8 E.forcipata
9 E.borealis

10 S.rostrata
11 S.irritans
12 S.calcitrans
13 S.pungens
* *magnified* ↓ *female*

G.F. Sc.

PLATE CV.—ENTOMOLOGY.

Order Hemiptera.

The Hemiptera terminate the numerous division of insects which are provided with elytra, (horny covers to the membranous wings,) and, of all those, are the only ones which have neither mandibles nor maxillæ properly so called. A tubular, articulated, cylindrical, or conical appendage curved inferiorly, or directed along the breast, having the appearance of a kind of rostrum, presents along its superior surface when raised, a groove or canal, from which may be protruded three rigid, scaly, extremely fine, and pointed setæ, covered at base by a ligula. These setæ, when united, form a sucker resembling a sting, sheathed in the tubular apparatus we have just described, where it is kept in situ by the superior ligula placed at its base. The inferior setæ consist of two filaments, which are united into one at a little distance from their origin, so that in reality the sucker is composed of four pieces.

The mouth of Hemipterous insects is only adapted for extracting fluid by suction; the attenuated stylets, of which the sucker is formed, pierce the vessels of plants and animals, and, the nutricious fluid being successively compressed, is forced into the internal canal, and thus arrives at the œsophagus. The sheath of this apparatus is at these times frequently bent into an angle or becomes geniculate. These insects, like other Suctoria, are furnished with salivary vessels.

The Hemiptera exhibit the same forms and habits in their three states. The only change they experience consists in the development and growth of the body. They usually have a stomach with firm and muscular parietes, a small intestine followed by a large one divided into several inflations, and biliary vessels, few in number, and inserted at a distance from the pylorus.

Fulgora laternaria, Linn. Lat. Great Locust.

A very large species, prettily variegated with yellow and russet: a large ocellated spot on each wing: snout strongly dilated, vascular, broad, and rounded anteriorly. Inhabits South America. Travellers assure us that this insect diffuses a strong light, when in the dark.

Cicada hæmatodes, Linn. Lat. Lesser Locust.

Black: incisures of the abdomen and nerves of the wings sanguineous. Inhabits the south of Europe.

Cicada spinosa, Linn. *Cicadella spinosa*, Lat.

Thorax three-horned, and produced behind to the length of the wings. Inhabits India.

Cicada stridula, Linn. Lat.

Villous; wing-cases grayish: wings yellow, with the margins hyaline.

Cicada taurus, Linn. *Cicadella taurus*, Lat.

Thorax two-horned, fuscous, filiform behind, and as long as the abdomen; horns arched. Inhabits the East Indies.

Cicada tibicien, Linn. Lat.

Scutel emarginate, wings with a greenish rib. Inhabits South America.

Fulgora candelaria, Linn. Lat. Chinese lantern-carrier.

A very elegant species, besprinkled with a kind of farinaceous substance on the wings and body, similar to that of F. laternaria, though in a very inconsiderable degree. Found in great abundance in some parts of the Chinese provinces.

Cicada phalænoides, Linn. Lat.

Notonecta glauca, Linn. Lat.

Six lines in length; yellowish above, with a russet tint on the elytra, the inner margin of which is spotted with blackish; scutellum black. To seize its prey with more facility, it swims on its back. Stings severely.

Cicada sanguinolenta, Linn. *Cereopis sanguinolenta*, Lat.

Four lines in length, black, with six red spots on the elytra. Resides in woods.

PLATE CVI.—ENTOMOLOGY.

Order Diptera.

The distinguishing characters of dipterous insects consist in six feet: two membranaceous, extended wings, with, almost always, two movable bodies above them called *halteres*; a sucker composed of squamous, cetaceous pieces, varying in number from two to six, and either inclosed in the superior groove of a probosciform sheath terminated by two lips, or covered by one or two inarticulated laminæ, which form a sheath for it. Their body is composed of three principal parts. The antennæ are usually inserted on the front and approximated at base. The base of the proboscis frequently bears two filiform or clavate palpi, composed, in some of five joints, but in the greater number of one or two. The wings are simply veined and most frequently horizontal.

Many of these insects are noxious, both by sucking our blood and that of domestic animals, by depositing their eggs on their body in order that their larvæ may feed on them, and by infecting our preserved meats and cerealia. Others in return are highly useful to us by devouring noxious insects, and consuming dead bodies and animal substances, left on the surface of the earth, that poison the air we breathe, and by accelerating the dissipation of stagnant and putrid water.

The larvæ of the Diptera are destitute of feet, though appendages that resemble them are observable in some.

Genus Tabanus.

The insects of this genus are very similar to large flies, and well known by the torment they occasion to cattle, by piercing their skin in order to suck their blood. Their head is as wide as the thorax, almost hemispherical, and with the exception of a small space, particularly in the males, occupied by two eyes generally of a golden-green, with purple spots or streaks.

These insects begin to appear towards the close of spring, are very common in the woods and pastures, and produce a humming noise, when on the wing. In some the proboscis is much longer than the head, slender, and usually terminated in a point, with the palpi very short in proportion to its length. The last joint of the antennæ is divided into eight annuli.

Fig. 1. *Tabanus bovinus*, Linn. Lat.

A well-known species; an inch long; body brown above, gray beneath; eyes green; tibiæ yellow; transverse lines and triangular spots of pale yellow on the abdomen: wings transparent, with russet-brown nervures.

Fig. 2. *Tabanus tropicus*, Linn. Lat.

Eyes with triple purplish fasciæ, and the sides of the abdomen ferruginous. Very troublesome to cattle. Inhabits Europe.

Fig. 3. *Tabanus bromius*, Linn. Lat.

Fig. 4. *Tabanus pluvialis*, Linn. *Haematopota pluvialis*, Lat.

Antennæ long, cylindrical, the last joint much elongated.

Fig. 5. *Tabanus rusticus*, Linn. Lat.

Fig. 6. *Tabanus cæcutiens*, Linn. *Chrysops cæcutiens*, Lat.

Eyes golden, with purple points: thorax yellowish-gray, streaked with black; abdomen yellowish above, with a broad black spot, forked at the end, on the two first annuli. They are constantly persecuting the horse.

ENTOMOLOGY.

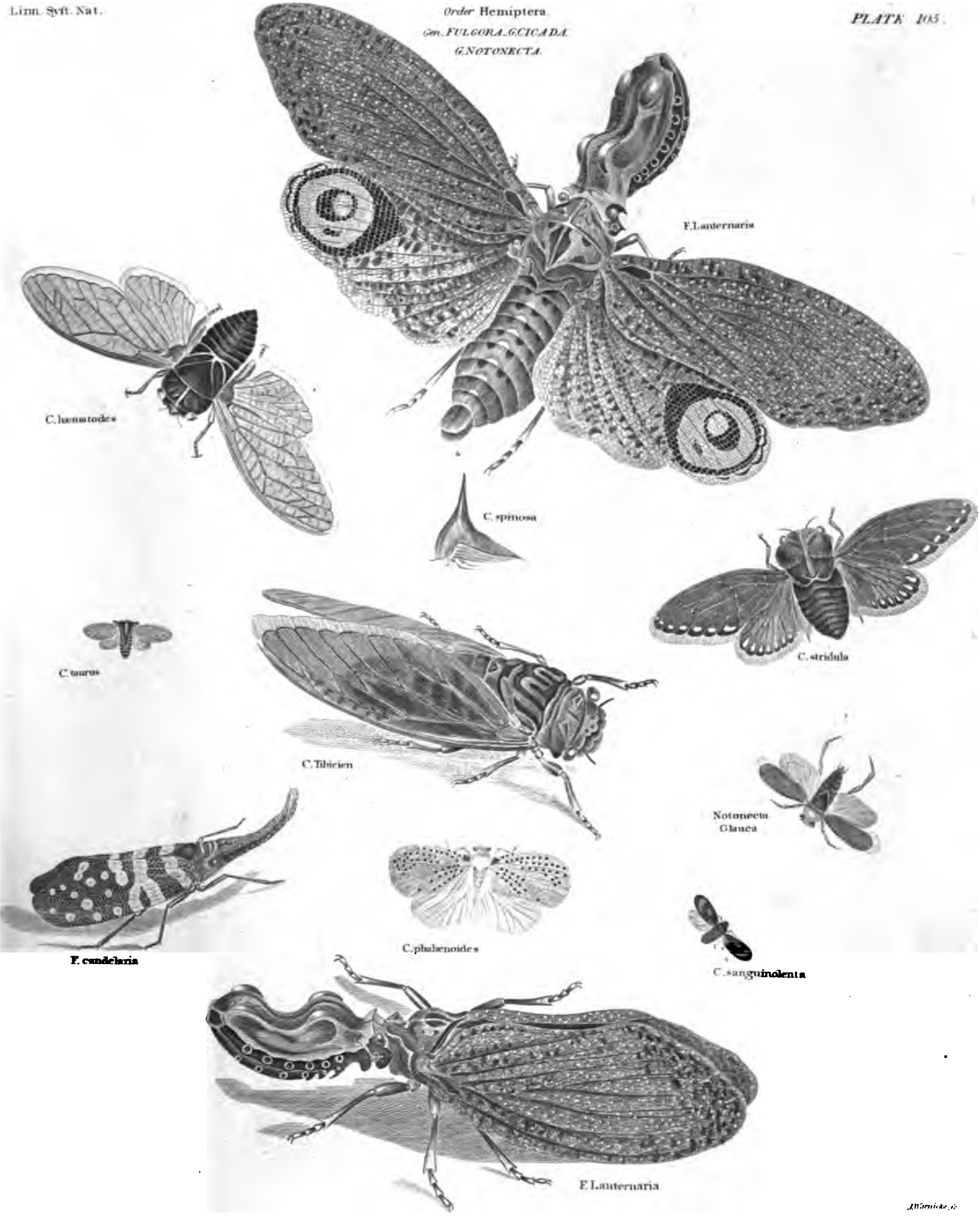
Linn. Syſt. Nat.

Order Hemiptera.

Gen. FULGORA_G.CICADA.

G.NOTONECTA.

PLATE 105.

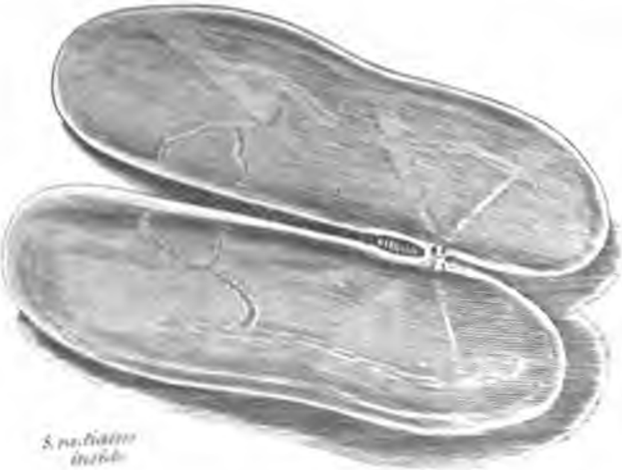


J.Warnicke, sc.

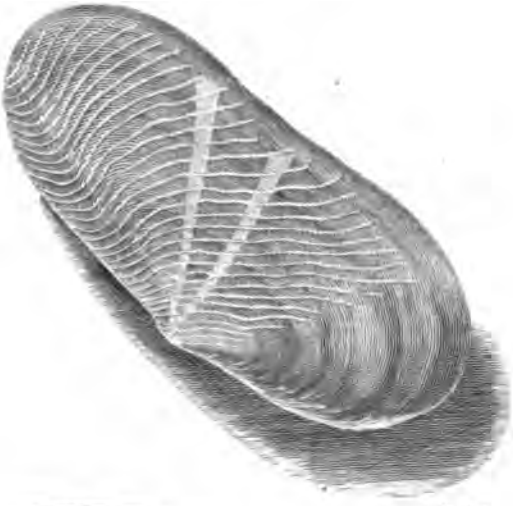
CONCHOLOGY.

GENUS SOLEN.

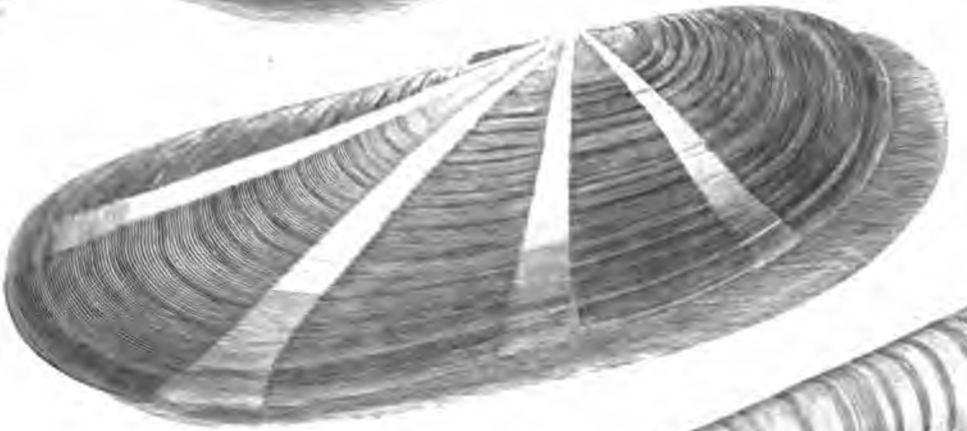
..nn. Syst.



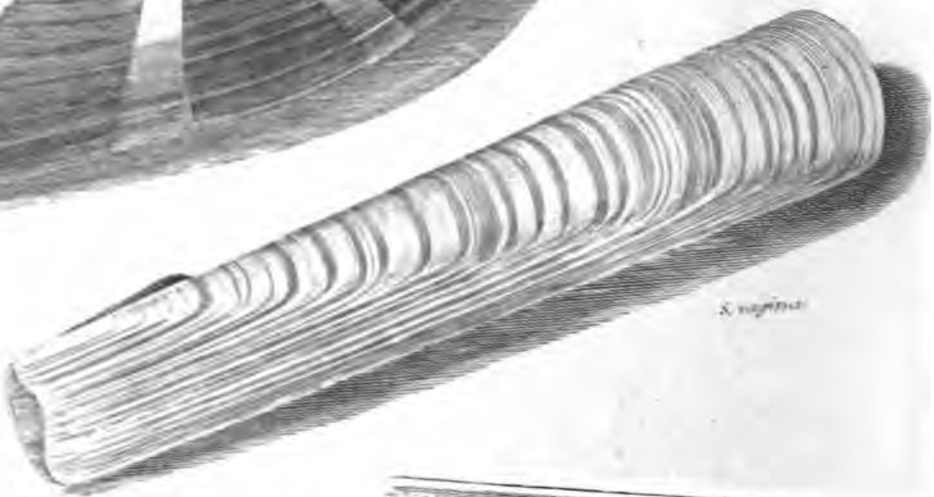
S. radiatus
inside



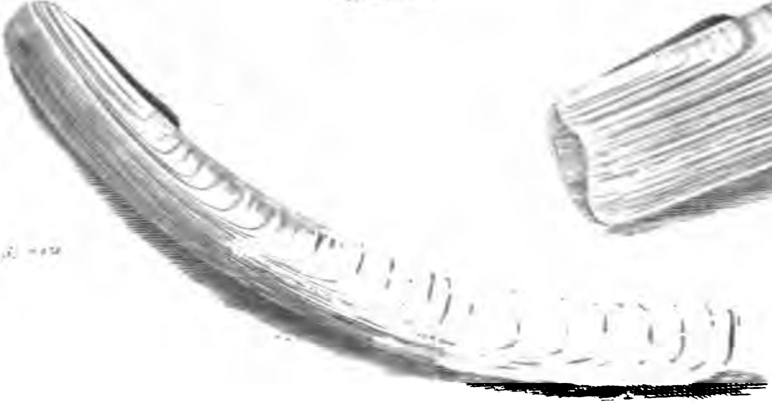
S. strigilatus



S. radiatus

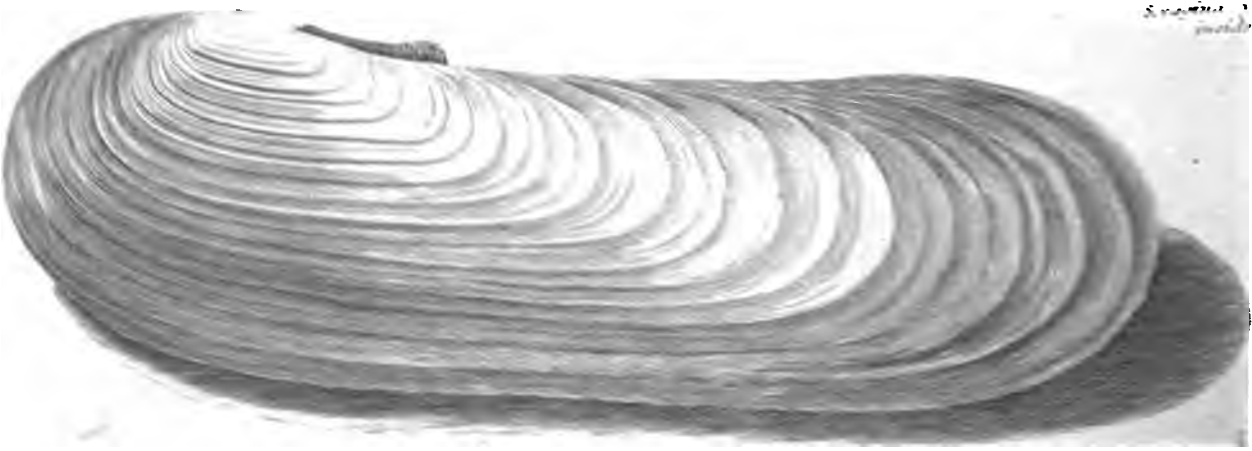


S. vagina



S. ensis

S. vagina. var.
inside



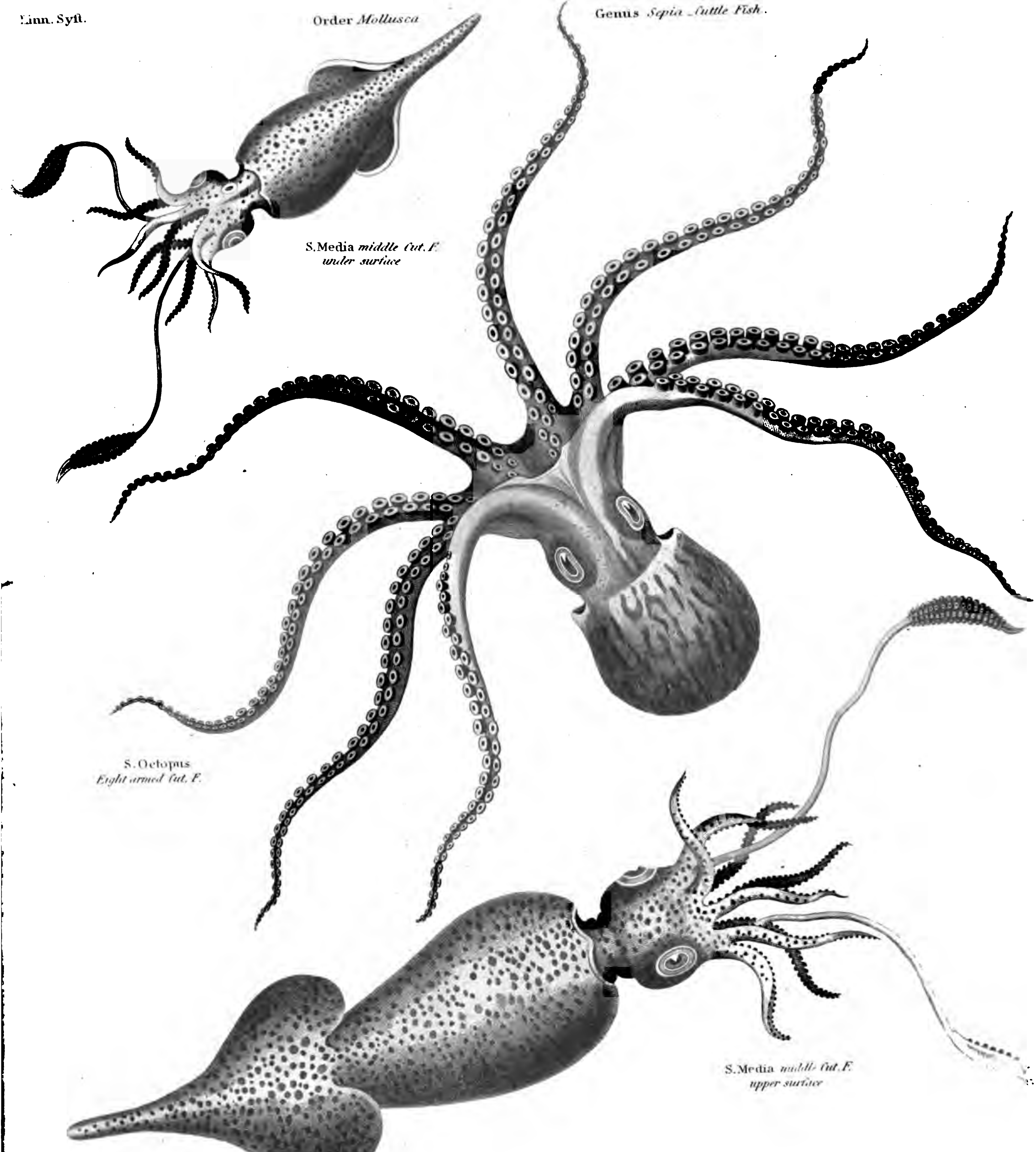
VERMES.

PLATE. 10

Linn. Syſt.

Order *Mollusca*

Genus *Sepia* _*Cuttle Fish.*



S.Media *middle Cut. F.*
under surface

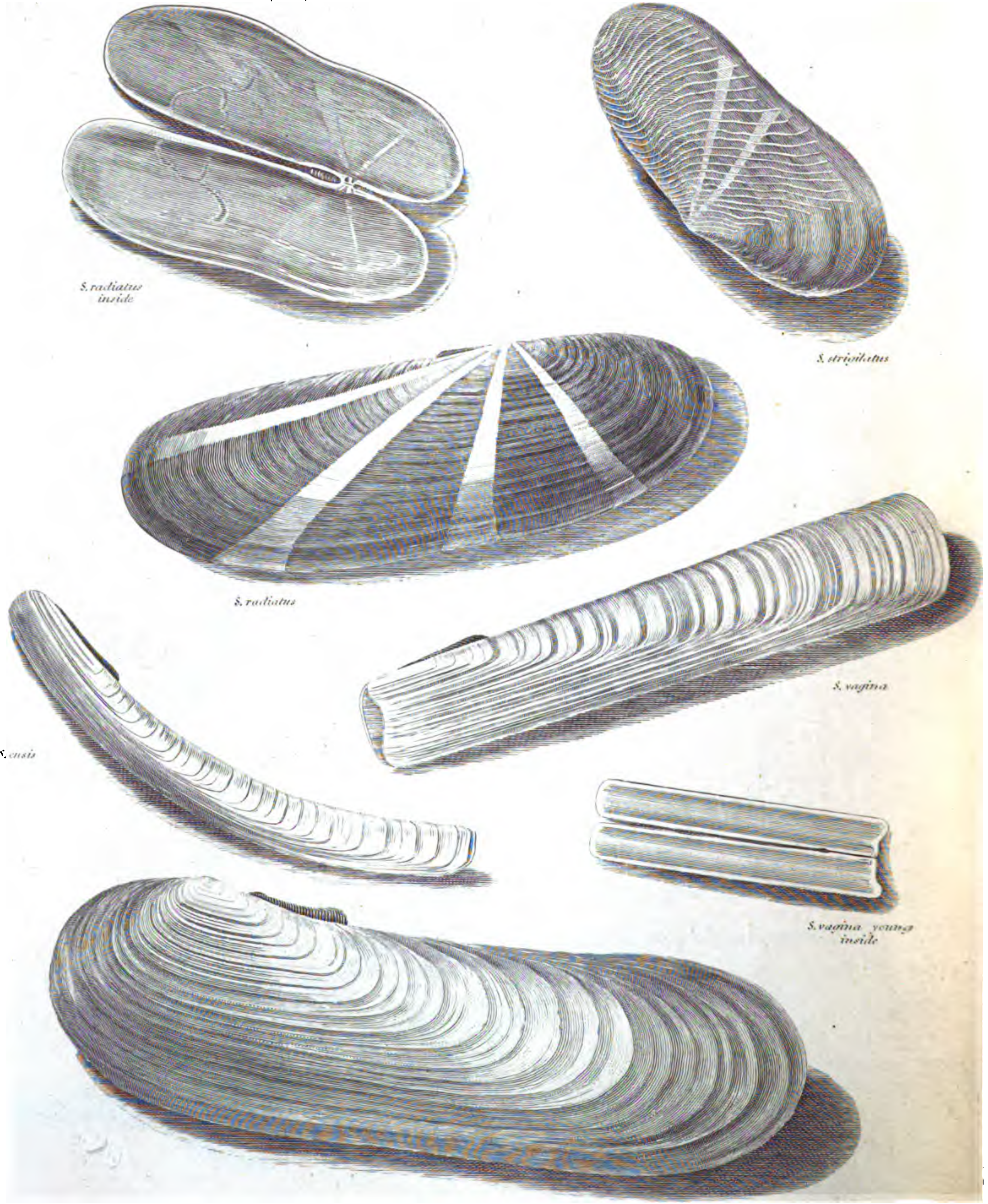
S. Octopus
Eight armed Cut. F.

S.Media *middle Cut. F.*
upper surface

H.

CONCHOLOGY.

GENUS *SOLEN.*

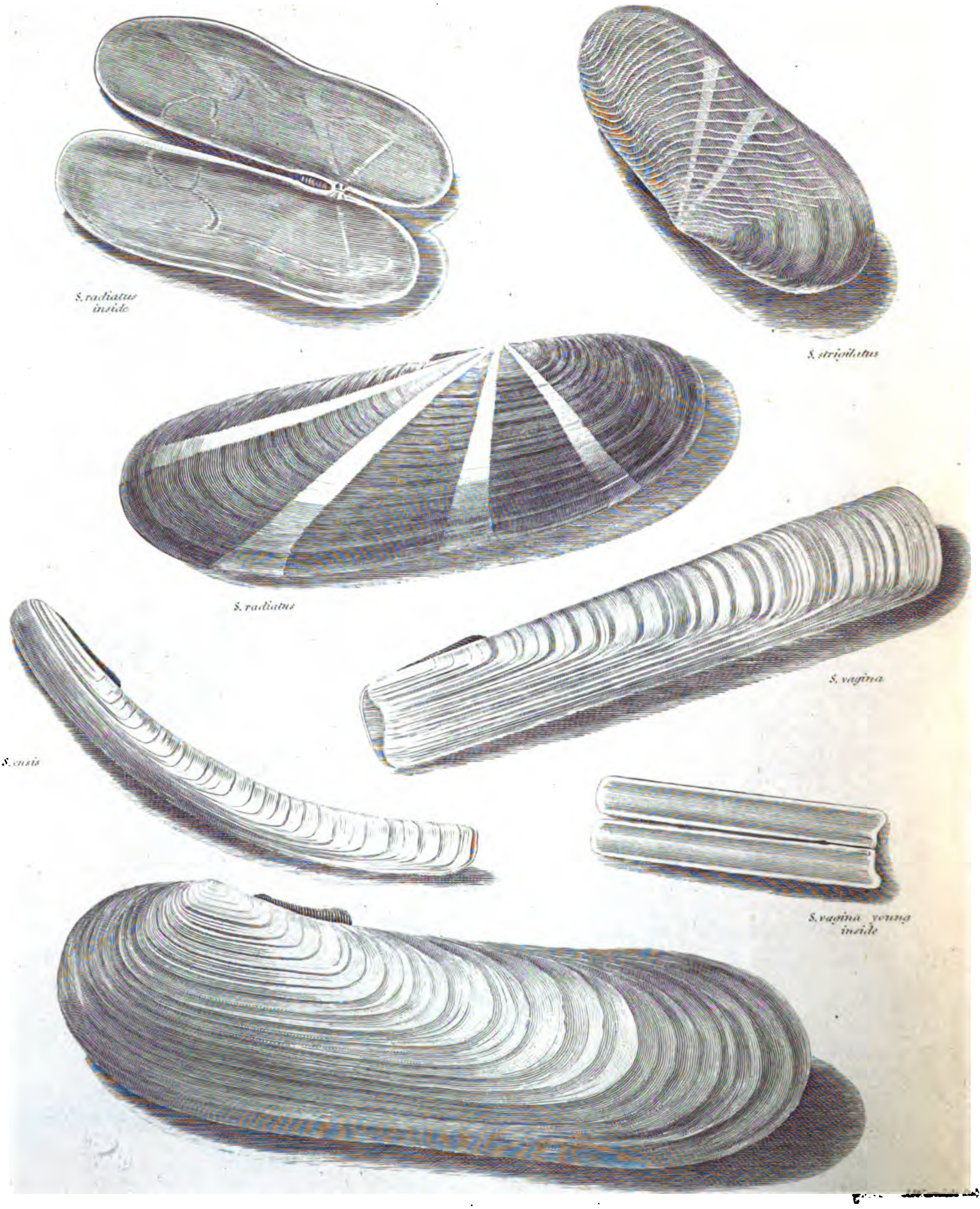


C

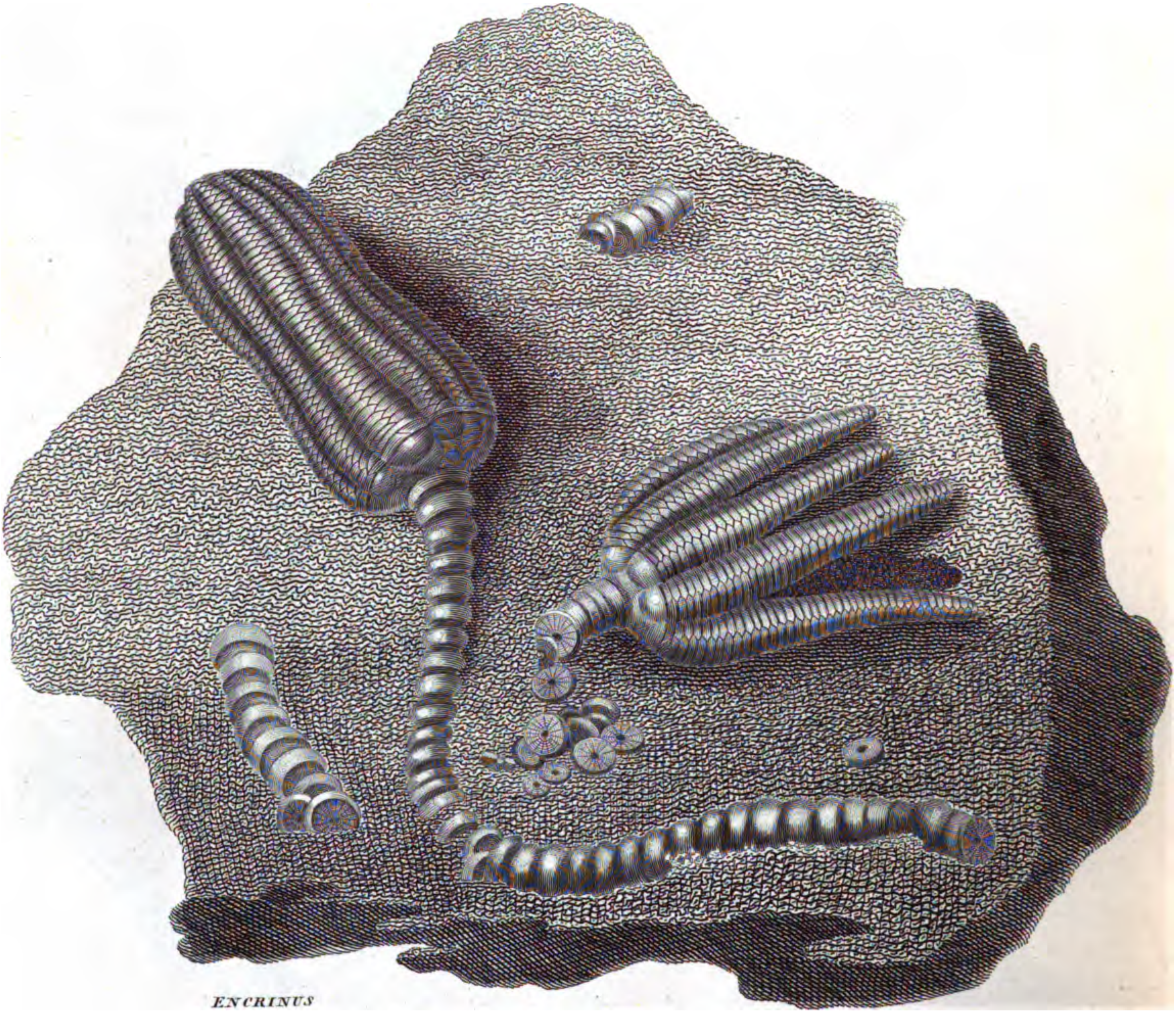
J.Warnick sculp.

CONCHOLOGY.

GENUS SOLEN.

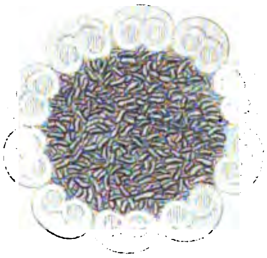


FOSSILS, *EXTRANEOUS*.

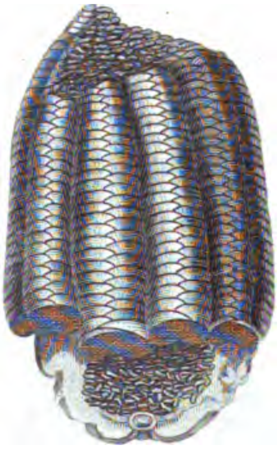


ENCRINUS

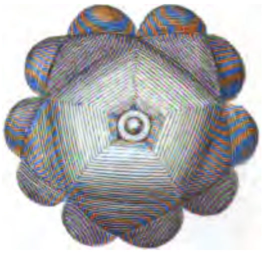
(Stone Lily)



Transverse Section of the Lily Head.



L.H.^d broken transversely.



Bottom of the L.^y Head.

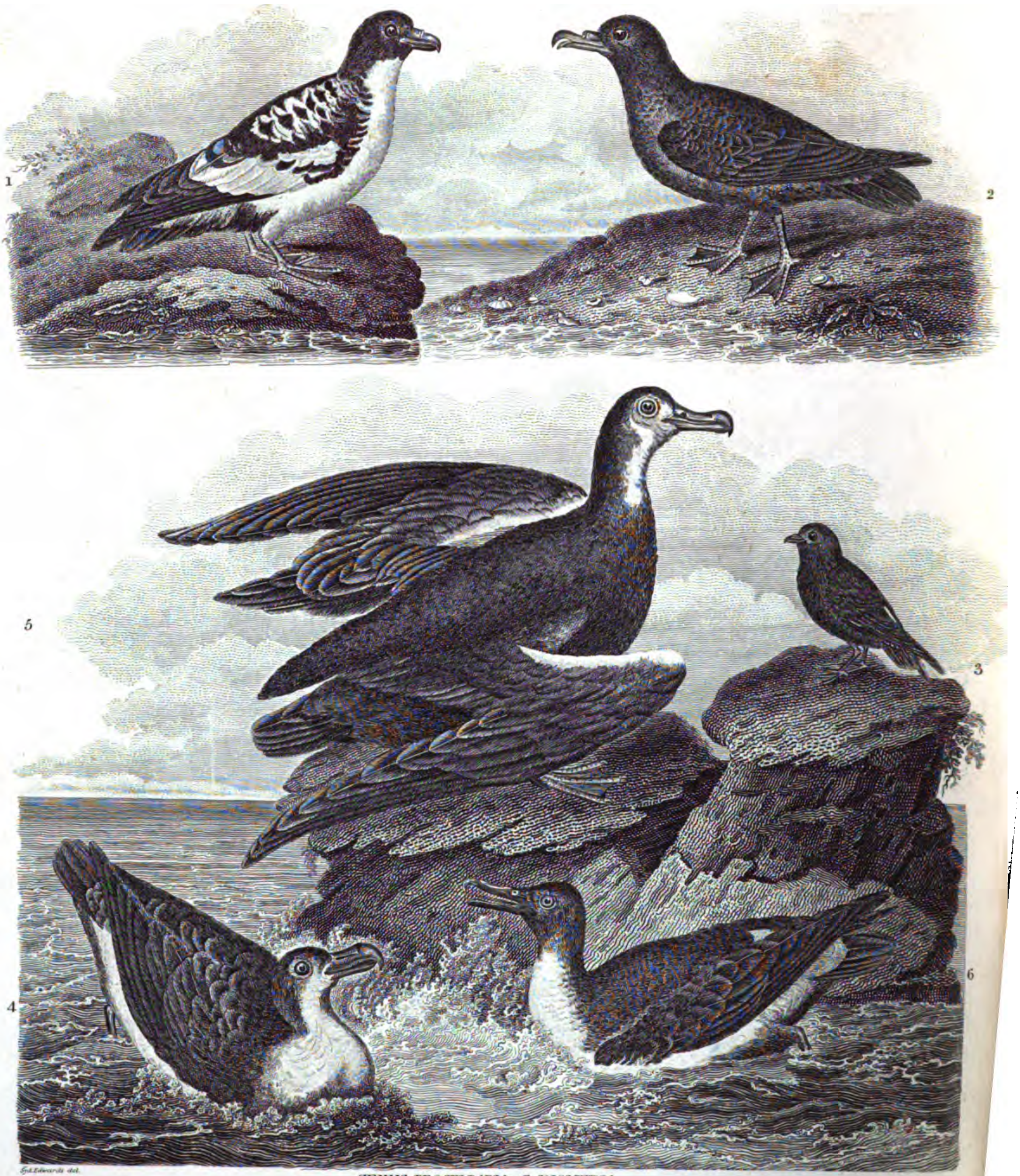
Donovan del.

Linn. Syſt.

ORNITHOLOGY.

Div. 2d. Water Birds Order 3d. ANSERES.

PLATE



Syd. Edwards del.

GENUS *PROCELLARIA* _ G *DIOMEDIA*
(Petrel) (Albatroſs)

1. P. *Capensis*	2. P. *Fuliginosa*	3. P. *Pelagica*	4. P. *Gigantea*	5. D. *spadicea*	6. D. *chlororynchos*
PINTADO P.	*SOOTY P.*	*STORMY P.*	*GIANT P.*	*CHOCOLATE A.*	*YELLOW NOSED A.*

Fig. 7. *Culex pipiens*, Linn. Lat. Mosquetoe.

Cinereous: abdomen annulated with brown; wings immaculate.

Fig. 8. *Empis forcipata*, Linn. Lat.

Fig. 9. *Empis borealis*, Linn. Lat.

Black; wings subrotund and ferruginous brown. Inhabits Sweden, Britain, and various other parts of Europe: swarms in the air, like the gnat, on a still evening.

Fig. 10. *Stromoxys rostrata*, Linn. Lat.

Fig. 11. *Stromoxys irritans*, Linn. Lat.

Fig. 12. *Stromoxys calcitrans*, Linn. Lat.

Body cinereous-gray, spotted with black; proboscis shorter than the body. Bites severely, particularly on the approach of rain.

Fig. 13. *Stromoxys pungens*, Linn. Lat.

PLATE CVII.—MOLLUSCA.

In a former number of this work, we gave the characters of this class of animals; it is therefore unnecessary to repeat them here.

Upper and lower figures, *Sepia media*, Linn. *Loligo media*, Cuv. Middle Cuttle-Fish.

Arms long, furnished with caps; fins placed near the point of the sac, and forming an ellipsis at the bottom of the sac, which terminates in a sharp point. Inhabits the European seas.

Middle figure, *Sepia octopus*, Linn. *Octopus vulgaris*, Cuv. Eight-armed Cuttle-Fish.

A common species, with a slightly rough skin, arms six times the length of its body, and furnished with one hundred and twenty pairs of cups. Infests the coast of Europe in summer, and destroys immense numbers of fishes and crustacea.

PLATE CVIII.—CONCHOLOGY.

Genus Solen, Linn. Cuv.

The shell of the Solen is cylindrically elongated, and has two or three teeth in each valve near the anterior extremity, where the foot issues. The latter is conical, and enables the animal to bury itself in the sand, which it excavates with considerable rapidity on the approach of danger.

Solen vagina. Chemn.

Inhabits along the coast of France.

Solen ensis. Chemn.

Inhabits along the coast of France.

Solen Strigilatus. Chemn.

Teeth wider and shorter than in the two preceding; foot extremely thick. Inhabits the Mediterranean.

Solen radiatus. Chemn.

Characters the same as in *S. Strigilatus.* Found also in the Mediterranean.

PLATE CIX.—FOSSILS.

Fossil Encrinites are very numerous, and so various, that they have been divided into several sub-genera, according to the composition of the central body placed on the summit of the stem, and from which the large rays proceed.

This body may be formed of pieces articulated with the stem, and bearing the rays by similar articulations. In this case, and if the stem be round and inflated above, we have the *Apiocrinites;* if it be round, but not inflated, *Encrinites:* if pentagonal, *Pentacrinus.*

Or this body may be formed of angular plates united at the edges, and forming several ranges.

The fossil productions known by the name of *Entrochites*, are portions of the stem and branches of animals belonging to this genus.

PLATE CX.—ORNITHOLOGY.

Order Anseres. Genus Procellaria. Genus Diomedia.

Fig. 1. *Pintado Petrel. Procellaria Capensis*, Linn. & Cuv.

This, which forms the type of the genus, is fourteen inches in length: the beak is black, and an inch and a half long: the head, hind part of the neck, the quills, and the tail, are black: the sides of the head are varied with black and white: the under parts of the plumage are whitish, irregularly spotted with black: the legs are black. The disposition of the colours of the plumage varies in some specimens: one is commemorated as having those parts that are usually white of a fine cream-colour; the tail white, with a black tip, and the base of the quills white.

Common in the Antarctic Seas, and particularly so in the vicinity of the Cape of Good Hope, where they fly in flocks; and appear occasionally in such prodigious numbers, that several hundreds have been captured in one night: they fly very low, almost touching the surface of the ocean. They feed on fish and the dead carcases of whales, and are very voracious: when caught, they will squirt out a quantity of oil from the nostrils upon the person holding them.

Fig. 2. *Sooty Petrel. Procellaria fuliginosa*, Linn. & Cuv.

This bird is eleven inches in length: its beak is black: irides pale cinereous: the head and neck are deep sooty-black; and the rest of the body brown-black, with the under parts palest: the rump is brown: the ridge of the wing is mixed with cinereous: the quills and tail are deep black; the latter is slightly forked, and scarcely so long as the wings when closed: the legs are slender, an inch long, and black. Inhabits the neighbourhood of Otaheite.

Fig. 3. *Stormy Petrel. Procellaria Pelagica*, Linn. & Cuv.

This species is about the size of a Swallow, and in its general appearance and flight not unlike that bird: its length is about six inches: its beak is black: its irides brown: the head, back, wings, and tail are deep black; its under parts are dusky soot-colour: its rump and neck are white: and its scapulars and secondary quills are tipped with white: the wings, when closed, are of an equal length with the tail, or reach but little beyond: the legs are black, and the tarsi are scarcely one inch in length. The young are more of a dusky hue.

This species inhabits the temperate northern regions of the old world, and prefers the open seas to the land; which it only visits during the period of incubation, and during its migrations. They fly in small flocks, even in the midst of the Atlantic. They are called *Mother Carey's Chickens* by mariners, and their appearance is much dreaded by them, as they are supposed to be the harbingers of an approaching storm. They are fond of sheltering themselves in the wake of a ship, probably for the sake of the various articles of food that are occasionally thrown overboard: but even in the most tempestuous weather they often amuse themselves by skimming along with the most incredible velocity among the hollows of the waves, and sometimes over their summits.

In the breeding season they betake themselves to the fissures of the rocks and rear their young, which they conduct to the watery element as soon as hatched: they lay one large egg, of a white colour, with an obscure band of purplish-brown, formed by minute specks at the larger end.

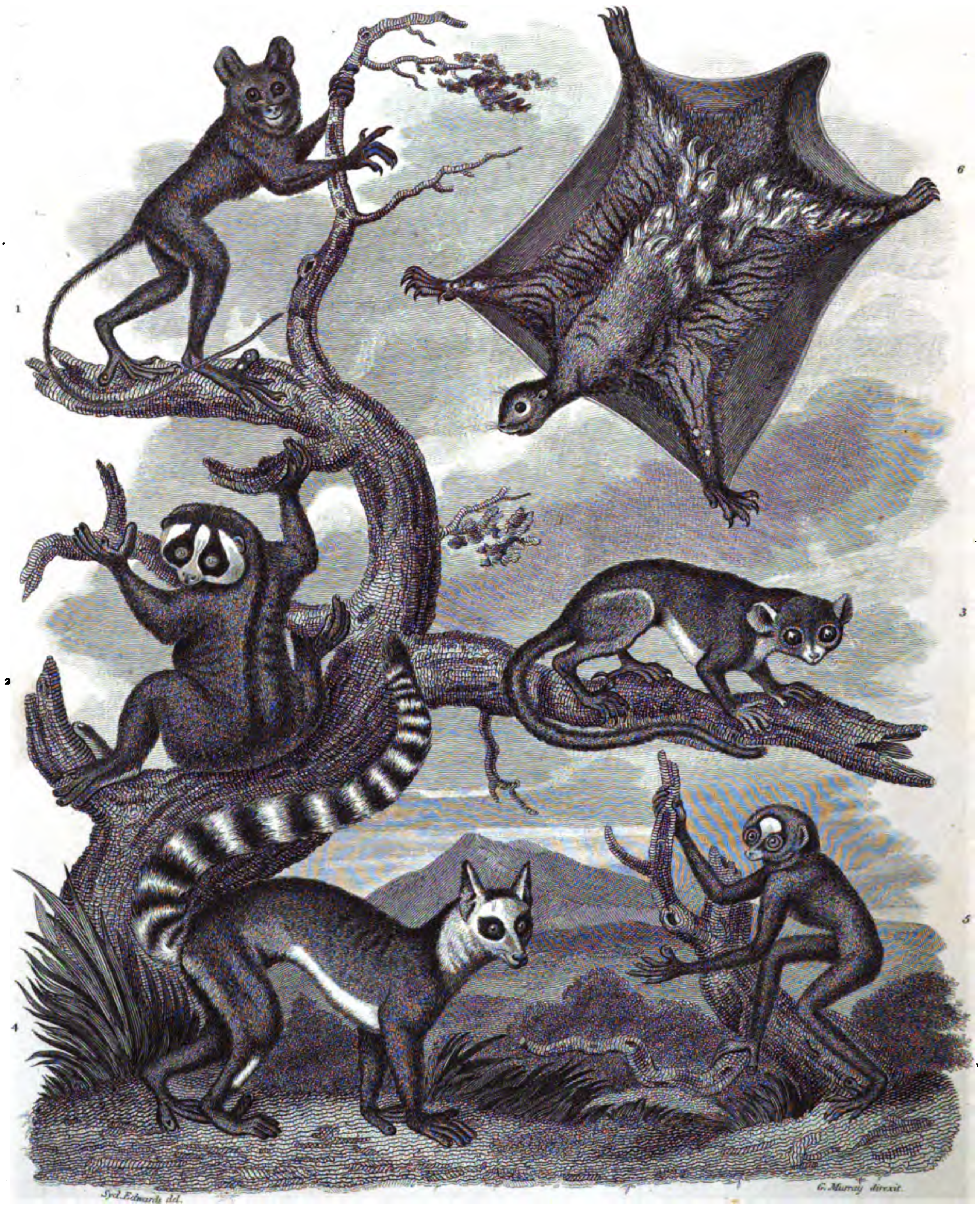
They are remarkably fat and oily, and the inhabitants of the Feroe Islands are said to draw a wick through the body of the bird, which, being lighted at one end, serves for a candle, the fat and oil of the body feeding the flames!

Linn. Syst.

PLATE I

QUADRUPEDS.

CLASS MAMMALIA ORDER PRIMATES. GENUS LEMUR. GENUS GALEOPITHECUS. GEOFF.



1. L. Podje Tarsier. — 2. L. Ecaudatus Tailleſs Maucauco. — 3. L. Murinus Murine Lemur. — 4. L. Catta Ring-Tail Maucauco. — 5. L. Tardigradus Loris.
6. L. Volans Flying Lemur (Galeopithecus rufus Andeb.)

Fig. 5. *Common Cuckow. Cuculus Canorus,* Linn. and Cuv.

Beak black, two-thirds of an inch long, and a little bent: yellowish at the base of the under mandible: inside of the mouth red: irides yellow: head and whole upper part of the bird dark ash-colour, darkest on the head: throat, under side of the neck, and upper part of the breast, pale ash, the latter in some inclining to rufous-brown: lower part of the breast and belly white, marked with transverse undulated black lines: vent buff, marked with a few dusky spots: wings very long, reaching within an inch and a half of the end of the tail: quill-feathers dusky, the inner webs barred with oval white spots: tail wedge-shaped, consisting of ten feathers of unequal length, the two middle ones black, dashed with ash-colour, and tipped with white; the rest are black, marked with white spots on each side the shaft: legs short and yellow.

Female rather less, differing in the neck and breast, being of a tawnyish-brown, barred with dusky: wing-coverts marked with light ferruginous spots; markings on the tail and quills like the male, excepting that the edges of the spots incline to reddish-brown.

Fig. 6. *Cupreous Cuckow. Cuculus Cupreus,* Linn. and Cuv.

The Cupreous Cuckow is about the size of a Lark, and is most elegant in its form: the beak is black: the head, neck, and upper parts of the body are of a brilliant copper colour, with a gold gloss: the feathers have much the appearance of scales, being greatly rounded: the belly and thighs are of a fine yellow: the tail is rather wedge-shaped, with one or two of the exterior feathers marked with a triangular white spot at the tip: legs black. Supposed to inhabit Africa.

Fig. 7. *Honey-Guide Cuckow. Cuculus Indicator,* Linn. *Indicator major,* Cuv.

This species, which is the one figured and described by Sparrman, is in length seven inches: beak half an inch; yellowish at the tip; thickened, and brown towards the base, which is armed with a few bristles, and in the male encircled with black: irides ferruginous gray: eyelids naked black: top of the head gray; the feathers broad and short: chin, throat, and breast dirty white, with a green tinge on the latter: back and rump ferruginous gray: belly and vent white: thighs white, with a longitudinal streak of black on each feather: upper wing-coverts gray brown, some of them tipped with yellow, forming a spot of that colour on the shoulders, which is generally covered by the scapulars: quills brown above; gray brown beneath: bastard wing gray brown: tail composed of twelve feathers, the middle ones very narrow and short; rusty brown both above and below; the two next, on each side, white, with brown tips, and a black spot on the inner webs at the base; the outer one shorter than the rest, and similar to the last, except that the black spot is not quite so conspicuous. It is said by Sparrman to inhabit the interior of the country from the Cape of Good Hope, where it is very common.

The skin of the honey-guides is thick, and the fibres so close as to be impenetrable by a pin, an admirable provision to guard these birds against the stings of the bees, on whose honey they feed.

PLATE CXII.—QUADRUPEDS.

Class Mammalia. Order Primates. Genus Lemur. Genus Galeopithecus.

Fig. 1. *Long-tailed tarsier. Lemur Podge Tarsier,* Linn. *Tarsius Spectrus,* Cuv.

This animal is distinguished by the great length of its hind legs. Its general length from the nose to the tail is almost six inches; and from the nose to the hind toes eleven inches and a half: the tail nine inches and a half. The face is sharp or pointed: the eyes very large and full: the ears upright, broad, naked, and rounded. Between the ears on the top of the head is a tuft of long hairs: several long hairs also proceed from each side of the upper chap: in each jaw, according to the observation of Mr. Pennant, are two cutting, and two canine teeth, forming an exception in this respect to the rest of the genus. The body is of a slender form; the feet are slender and the claws pointed: the thumbs are large and rounded The legs and feet are but thinly covered with hair: the tail also is thinly covered, except towards the end, where it is terminated by a tuft. The colour of this species is gray-brown or mouse-colour, paler beneath. It is a native of Amboina and some other East-Indian Islands.

Fig. 2. *Tailless maucauco. Lemur Ecaudatus,* Linn. *Stenops targigradus,* Cuv.

This is the species described by the Count de Buffon under the name of the Vari, its colours often consisting of a patched distribution of black and white; though its real or natural colour is supposed to be entirely black. In size it exceeds the Mongoz, or Brown Lemur. It is said to be a fierce and almost untameable animal. It inhabits the woods of Madagascar and some of the Indian islands; and is said to exert a voice so loud and powerful as to strike astonishment into those who hear it, resembling, in this respect, the howling Monkey or S. Belzebub, which fills the woods of Brazil and Guiana with its dreadful cries. When in a state of captivity, however, it seems to become as gentle as some others of this genus. That described and figured by Edwards was an example of this, and is expressly said to have been "a very sociable, gentle, harmless-natured animal, not having the cunning, mischievousness, or malice of the Monkey kind."

The astonishing strength of voice in this animal depends, according to the Count de Buffon, on the peculiar structure of the larynx, which widens, immediately after its divarication, into a large cavity before entering the lungs.

Fig. 3. *Murine Lemur. Lemur murinus,* Linn. *Galago murinus,* Cuv.

Its size is somewhat less than the black rat; and its colour is an elegant pale cinereous or gray on the upper parts, and white beneath: the eyes are encircled by a zone of a deeper colour: the ears are large, naked, rounded, and thin: the eyes very large and full: the tail is hairy, of the length of the body, and prehensile, or capable of coiling at pleasure round any object, as in some of the small monkeys: the toes are rounded at the ends, and have also rounded nails, but those on the first toe on each hind foot are long and sharp.

Fig. 4. *Ring-tail macauco. Lemur Catta,* Linn. and Cuv.

This is by far the most beautiful animal of the genus. Its size is that of a small cat, but of a more slender shape: its colour is a pale grayish brown, with a slight cast of ferruginous on the back and outsides of the limbs: the under parts of the body are whitish: the nose black: the eyes bright orange-hazel, surrounded by a distinct circle of black: the hands and feet black; the fingers and toes furnished with round nails. The tail is very long, and beautifully marked throughout the whole length with distinct circles of black and white: the fur on the whole animal, but more particularly on the tail, is very fine, soft, and sub-erect in its growth, so as to give a greater degree of thickness to the tail than if it grew in a more oblique direction. The manners of this species are gentle and lively: it possesses the highest degree of activity, and its motions have an ease and elegance surpassing almost every other quadruped. In their native state these animals live in society, and are seen in troops of thirty or forty together in the woods, where they feed principally on fruits. In a state of confinement they will not only eat fruits of different kinds, but likewise animal food; and in this respect the present species, the Mongoz, and the Vari, agree; all feeding nearly in the same manner. The Macauco delights much in sunshine, and in sitting before the fire: its general attitude at such times is similar to that assumed by a squirrel when feeding, sitting upright and often extending forwards its spread hands.

Fig. 5. *Loris Lemur Targigradus*, Linn. *Stenops Gracilis*, Cuv.

This animal is called the slow lemur, and is about the size of a rat. A native of India,

Fig. 6. *Flying Lemur. Lemur Volans*, Linn. *Galeopithecus*, Cuv.

The Colugo is a native of the Molucca and Philippine islands, where it is said to frequent woody places, and to feed principally on fruits. It almost constantly resides on trees, and makes use of its membranes in the same manner as the flying squirrel. In descending from the top of a tree, it spreads its membranes, and balances itself to the place it aims at in a gentle manner; but in ascending it uses a leaping pace. It has two young, which are said to adhere to its breasts by the mouth and claws. The whole length of the animal is about three feet: the breadth, when expanded, nearly the same: the tail is slender and about a span long. The membrane, or expansile skin, by which it is enabled to fly, is continued, on each side, from the neck to the fore feet; thence to the hind feet; and again to the tip of the tail: it is not naked, like the skin of a bat's wing, but covered with fur, in the same manner as the body: the inner or lower side, however, appears membranaceous, and is marked by numerous veins and fibres dispersed through it. The whole upper side of the animal is generally of a deep ash-colour, most so in those which are full-grown, and blacker in the younger or less advanced specimens.

PLATE CXIII.—ICHTHYOLOGY.

Genus Syngnathus. Pipe Fish.

This singular fish derives its name from that remarkable structure of its mouth, by which the jaws are made to grow together, and the very end of the mouth only opens.

The head of this fish is very small; the snout nearly cylindrical, long, turned up at the end; mouth terminal, without teeth or tongue, and furnished with a lid; the lower jaw is movable; gill-covers large, striate and closed: the spiracle on the nape is tubular; the body is jointed, and mailed with many-sided scales; it has no ventral fins.

The fish of this genus inhabit the ocean near the shores; they feed on lesser worms and insects, and the spawn of other fish: under the tail, commencing at the vent, is a longitudinal groove, concealing the young, and the eggs: the eyes of the animal are small, covered at the sides with a membrane: the nostrils near the eyes, but scarcely to be seen; the palate is smooth; the gill-membrane is very thin, placed on the nape; the fins are small, thin, the rays undivided; it has no lateral line.

Fig. 1. *Syngnathus foliatus*, Linn. *Hippocampus foliatus*, Cuv. *Foliated Pipe-fish.*

This is a most extraordinary species, far exceeding all the others in the singularity of its appearance, which at first view rather suggests the idea of some production of fancy, than of any real existence. It is longer in proportion, or of a more slender habit, than the other pipe-fish. Its great peculiarity consists in the large leaf-shaped appendages with which the back, tail, and abdomen, are furnished; these appendages are situated on very strong, rough square spines or processes; and, were it not for the perfect regularity of their respective proportions, might be mistaken for the leaves of some kind of fucus adhering to the spines. The colour of the whole animal is of a dusky or blackish-olive, thickly sprinkled on all parts, except on the appendages, with small round whitish specks, and accompanied by a kind of metallic gloss on the abdomen; the fins are soft, tender, and transparent. This curious species is a native of the Indian seas.

Fig. 2. *Syngnathus acus*, Linn. and Cuv. *Great Pipe-fish.*

This species is also called the Needle-fish. It is usually found from twelve to fifteen inches long, but in the northern seas it is much larger, measuring from two to three feet; it is of an extremely slender form, gradually tapering towards the extremity, and is of a pale yellowish-brown colour, varied throughout its whole length with broad alternate zones of a deeper or olive-brown, with a few smaller variegations intermixed: the shields or laminæ with which the joints of the body are covered, appear, if narrowly inspected, to be finely radiated from the centre, by numerous lines or streaks; the dorsal fin is placed rather nearer the head than the tail, and is thin, tender, shallow, and of no great extent; the pectoral fins are small, and slightly rounded, and the tail of similar shape and size. The ova are found lying in a longitudinal channel or division at the lower part of the abdomen; they are very large in proportion to the size of the fish. From these are hatched the young, completely formed.

Fig. 3. *Syngnathus hippocampus*, Linn. *Hippocampus vulgaris*, Cuv. *Sea-horse Pipe-fish.*

This fish has, like the others of its genus, a very singular appearance; it is generally from six to ten inches in length; the body is much compressed; it is of a greenish-brown, varied with darker and lighter specks; the head is large and rather thick, and beset on the upper part, as well as along some of the first joints of the body, with several small, weak, lengthened spines, or cirri, which are sometimes slightly ramified; the snout is slender, the neck suddenly contracting beyond the head; the body is rather short, and suddenly contracting towards the tail, which is long, quadrangular, and terminates in a naked or finless tip. In its dry or contracted state, this animal exhibits the fancied resemblance from which it takes its name, but in the living fish this appearance is somewhat less striking; the head and tail being carried nearly straight. It is a native of the Mediterranean, Northern, and Atlantic Seas.

Genus Pegasus.

Mouth beneath; snout retractile; the upper jaw elongated, denticulate, ensiform, and linear; aperture of the gills single, before the pectoral fins; body compressed downwards, articulate with bony incisures, and mailed; ventral fins behind the pectoral.

Fig. 4. *Pegasus draco*, Linn. and Cuv. *Dragon Pegasus.*

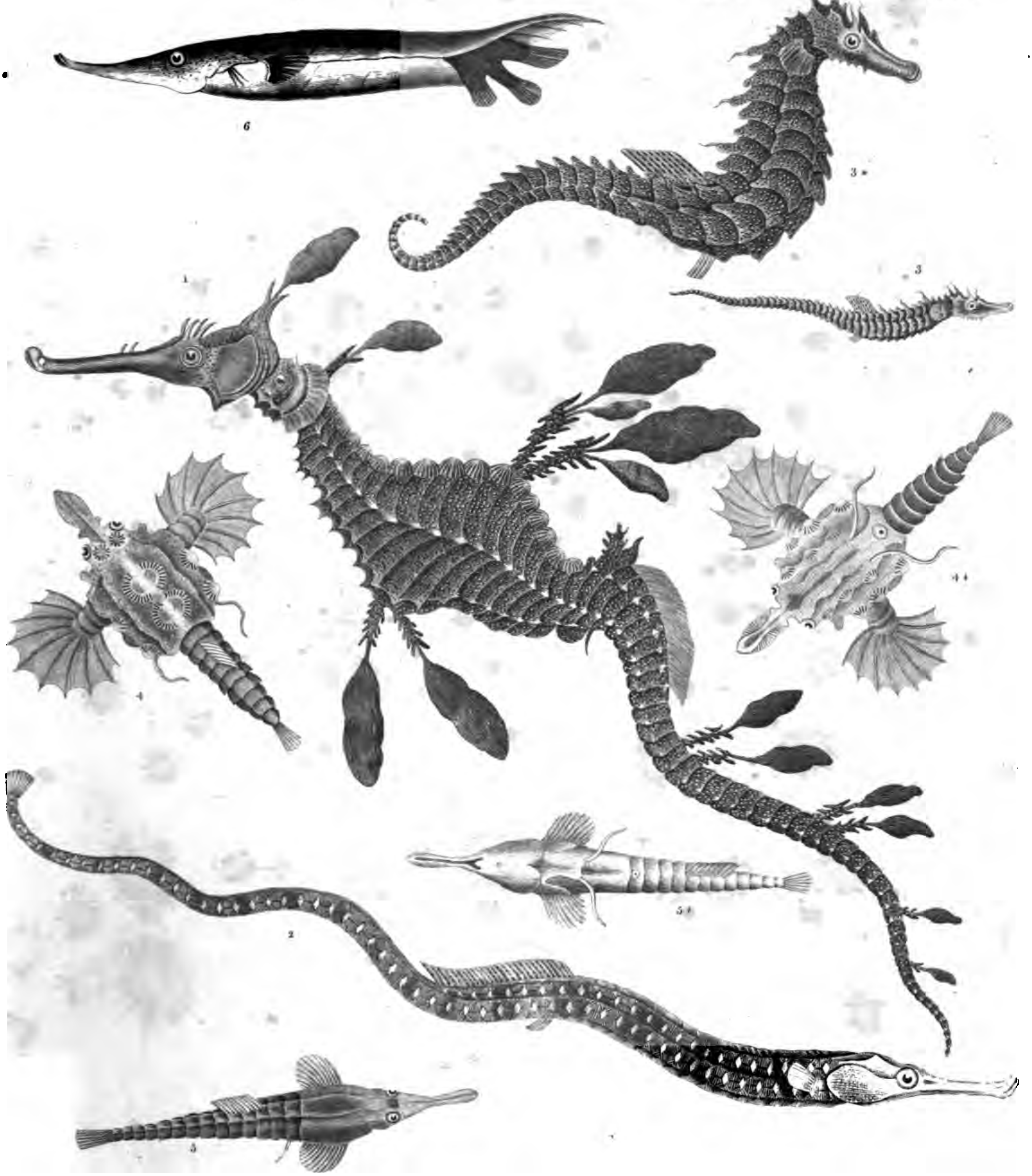
This species has a conical snout; it is a small fish, three or four inches in length, and is remarkable for the size of its pectoral fins, which are supposed to enable it, like the exocoeti, and some other fishes, to support itself for a few seconds in the air, while it springs occasionally over the surface of the water. The thorax or superior part of the body is of a broad, slightly flattened, squarish form, and is marked, both above and beneath, by several radiated shields, or bony tubercles of considerable size; from each side of the abdomen springs a lengthened cirrus, which may be considered as supplying the place of a ventral fin; from the thorax the body suddenly decreases in diameter, and is marked into several divisions or transverse segments; the tail is small and slightly rounded; the pectoral fins are, as has been already observed, large in proportion to the size of the animal, and of a rounder shape, with a kind of scalloped or indented outline; the eyes are large and protuberant, and the snout of a sub-conical form, but with a slight dilatation towards the tip, so as to appear spatule-shaped when viewed from above. The colour of the whole animal is whitish, with a slight cast of pale brown. Inhabits the Indian seas.

Fig. 5. *Pegasus natans*, Linn. and Cuv. *Swimming Pegasus.*

The snout of this species is ensiform and unarmed. It is about three inches in length; the colour is yellowish-brown, whitish beneath; snout slender, slightly dilated and rounded at the tip; marked above and beneath by a middle furrow; pectoral

Linn. Syſt. **ICHTHYOLOGY.** *PLATE 113.*

Order Branchiostegi. GENUS *SYNGNATHUS* _ G. *PEGASUS* _ G. *CENTRISCUS*
(Pipe-Fish) (Pegasus) (Centriscus)



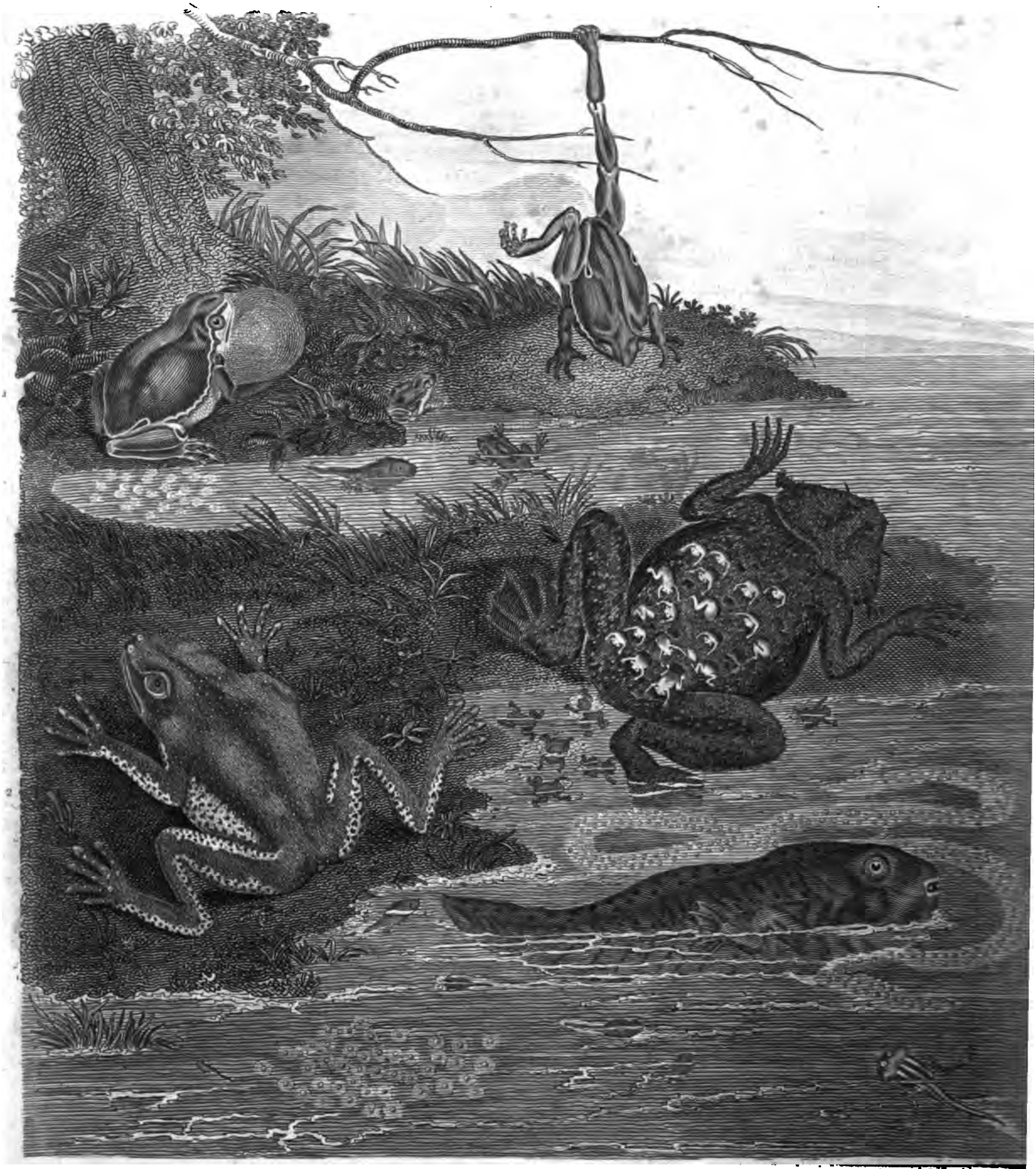
1. S. *foliatus*	2. S. *acus*	3. S. *hippocampus*	4. P. *draco*	5. P. *natans*	6. C. *scutatus*	* *magnified*
FOLIATED P.F.	*GREAT P.F.*	*SEA HORSE P.F.*	*DRAGON P.*	*SWIMMING P.*	*MAILED C.*	+ *under surface*

J. Vallance sc.

AMPHIBIA.

GENUS *RENA*.

PLATE II



[Family Frog Family Toad.]

1. R. *Pipa*.
SURINAM TOAD *with its Young*.

2. R. *Bicolor*.
TWO COLOURED FROG.

3. *Fish like Tadpole*.
of a PARADOXICAL FROG.

4. R. *Arborea*.
TREE FROG.

fins rounded and of a moderate size; the dorsal fin is situated on the middle of the back; segments of the abdomen about eleven or twelve in number; the tail is small and slightly rounded; the ventral cirri slender and flexible.

Genus Centriscus.

This is the trumpet, or bellows-fish, of Ray; it is an inhabitant of the Mediterranean sea, and has been recently discovered on the coast of Cornwall. It is a small fish, measuring commonly from four to five or six inches in length, or rarely eight. The body is much compressed laterally, and is entirely covered with hard pointed scales: the colour red, or reddish, darkest or inclining to purplish on the back, and silvery on the belly, and the whole surface glossed with a tinge of gold. The first dorsal fin consists of four strong bony rays, the anterior one of which is movable, very strong, jagged or denticulated on each side, and with the rest of the fin is situated in a small hollow on the rise of the back. The spring ray is the only defensive weapon with which nature has furnished this species. In the south of Europe, where it is not unfrequent, it is esteemed an edible fish; the flesh is tender, of a good flavour and easy digestion.

Fig. 6. *Centriscus scutatus*, Linn. *Amphisile scutata*, Cuv. *Mailed Centriscus.*

Back covered with a smooth bony shell. This species has the body so much compressed as to resemble a lamina, particularly on the abdomen, where it is membranaceous; the back is covered with smooth, golden, and closely united plates: sides pellucid, yellowish, and silvery: beneath tortoise-shell, marked with transverse white lines: pectoral and ventral fins yellowish, the rest brown. Length from six to eight inches: inhabits the Indian seas, and subsists on marine worms, and small crabs.

PLATE CXIV.—AMPHIBIA.

Genus Rana.

Fig. 1. *Surinam Toad, with its young. Rena pipa*, Linn. *Pipa Vulgaris*, Cuv.

This is one of those animals which, at first view, every one pronounces deformed and hideous; the general uncouthness of its shape being often aggravated by a phenomenon unexampled in the rest of the animal world, viz. the young in various stages of exclusion, proceeding from cells dispersed over the back of the parent.

The size of the Pipa considerably exceeds that of the common toad: the body is of a flattish form; the head subtriangular; the mouth very wide, with the edges or corners furnished with a kind of short cutaneous, and, as it were, lacerated appendage on each side: in the male, however, the head is rather oval than triangular, and the parts just mentioned less distinct: the fore feet are tetradactylous, the toes long and thin, and each divided at the tip into four distinct portions or processes, each of which, if narrowly inspected with a magnifier, will be found to be again obscurely subdivided almost in a similar manner: the hind feet are five-toed, and very widely webbed; the web reaching to the very tips of the toes. The male Pipa is larger than the female, measuring sometimes not less than seven inches from the nose to the end of the body: the nose in both sexes is of a somewhat truncated form, like that of a mole, or hog, and the eyes extremely small: from each eye, in the female, run two rows of granules or glandular points to the middle of the back: the whole body is also covered with similar points or glandules, but smaller than the former.

It was for a long time supposed that the ova of this extraordinary animal were produced in the dorsal cells, without having been first excluded in the form of spawn; but later observations have proved that a still more extraordinary process takes place; and that the spawn, after exclusion, is received into the open cells of the back, and there concealed till the young have arrived at maturity. This discovery was made by Dr. Fermin, who had an opportunity, during his residence at Surinam, to investigate the natural history of the Pipa in a more accurate manner than had before been practicable. His account is, that the female Pipa deposits her eggs or spawn at the brinks of some stagnant water; and that the male collects or amasses the heap of ova, and deposits them with great care on the back of the female, where, after impregnation, they are pressed into the cellules, which are at that period open for their reception, and afterwards close over them; thus retaining them till the period of their second birth; which happens in somewhat less than three months, when they emerge from the back of the parent in their complete state. During the time of their concealment, however, they undergo the usual change of the rest of this genus, being first hatched from the egg in the form of a tadpole; and gradually acquire their complete shape, some time before their exclusion.

Fig. 2. *Two-coloured Frog. Rena Bicolor*, Linn. *Hyla Bicolor*, Cuv.

This is a moderately large species; the body measuring rather more than four inches in length. The whole upper surface, both of body and limbs, is of an elegant blue colour: the under parts are of a pale orange or rather ochre colour; and along the sides are disposed several oblong and round, slightly convex, glandular white spots or pustules: the head is large; the mouth wide; and the tip of the nose truncated or abruptly terminated: the fore feet have four and the hind feet five toes, all terminated by a large orbicular tip; and beneath every joint of the toes is a process or tubercle. Different specimens appear to vary somewhat in their colours, the blue being more intense, and the orange-colour of the lower parts deeper; the limbs are also sometimes tinged with purplish bands or shades: the lower part of the abdomen is marked with numerous whitish round granules.

The female has more of the violet cast on the upper parts than the male, and the whitish marks on the side, &c. are more conspicuous.

This elegant species is supposed to be a native of Surinam.

Fig. 3. *Fish-like Tadpole*, or *Tadpole of Rana Paradoxica.*

The tadpole of the Parodoxical Frog, from its very large size, the strong and muscular appearance of the tail, and the ambiguous aspect which it exhibits in the latter part of its progress toward its complete or ultimate form, has long continued to constitute, as it were, the parodox of European naturalists; who, however strong and well-grounded their suspicions might be relative to its real nature, and the mistake of most describers, were yet obliged, in some measure, to acquiesce in the general testimony of those who had seen it in its native waters, and who declared it to be at length transmuted, not into a frog, but a fish! and it was even added by some, that it afterwards reverted to its tadpole form again!! That it is really no other than a frog in its larva or tadpole state, will be evident to every one who considers its structure.

Like the European tadpoles, this animal, according to the more or less advanced state in which it is found, is furnished either with all the four legs, or with only the two hinder ones: it also sometimes happens that in the largest sized of these tadpoles, exceeding perhaps the length of six or eight inches, the hind legs alone appear; while in those of far smaller size both the fore and hind legs are equally conspicuous. It is a native of South America. The frog which [illegible] from this tadpole is of a yellowish olive colour, spotted with brown.

Fig. 4. *Tree frog. Rena Arborea*, Linn. *Hyla Arborea*, Cuv.

In the beauty of its colours, as well as in the elegance of its form, and agility of its movements, the Tree Frog exceeds every other European species. It is a native of France, Germany, Italy, and many other European regions, as well as America, but is not found in the British islands. Its principal residence, during the summer months, is on the upper parts of trees, where it wanders among the foliage in quest of insects, which it catches with extreme celerity, stealing softly toward its prey in the manner of a cat towards a mouse, and when at the proper distance, seizing it with a sudden spring, frequently of more than a foot in height. It often suspends itself by its feet, or abdomen, to the under parts of the leaves, thus continuing concealed beneath their shade. Its size is smaller than any other European frog, except the Fire Frog. Its colour, on the upper parts, is green, more or less bright in different individuals: the abdomen is whitish, and marked by numerous granules: the under surface of the limbs is reddish, and the body is marked on each side by a longitudinal blackish or violet coloured streak, separating the green of the upper parts, from the white colour of the lower: the inferior edge of this dark lateral stripe is tinged with yellow. The body is smooth above, and moderately short or plump: the hind legs are very long and slender: the fore feet have four and the hind feet five toes, all of which terminate in rounded, flat, and dilated tips, the under surface of which, being soft and glutinous, enables the animal to hang with perfect security from the leaves of trees, &c. The skin of the abdomen is also admirably calculated by nature for this peculiar power of adhesion, being covered with small glandular granules in such a manner as to fasten closely even to the most polished surface: and the animal can adhere at pleasure to that of glass, in whatever position or inclination it be placed, by merely pressing itself against it.

Though the Tree Frog inhabits the woods during the summer months, yet on the approach of winter it retires to the waters, and there submerging itself in the soft mud, or concealing itself beneath the banks, remains in a state of torpidity, and again emerges in the spring, at which period it deposits its spawn in the waters, like the rest of this genus. The male at this period inflates its throat in a surprising manner, and exerts a very loud and sharp croak, which may be heard to a vast distance. The spawn is deposited about the end of April, in small clustered masses; the inclosed globules or embryos being of a pale yellowish brown colour. The tadpoles become perfect Frogs, by the total decay of the tail, about the beginning of August; and soon begin to ascend the neighbouring trees, where they continue to reside during the remainder of the warm season; as do likewise the parent animals, after the breeding season is past. During their residence among the trees, they are observed to be particularly noisy on the approach of rain; so that they may be considered, in some measure, as a kind of living barometers; more especially the males, which, if kept in glasses, and supplied with proper food, will afford an infallible presage of the changes of weather. In the German *Ephemerides Naturæ Curiosorum* we meet with an account of one which was kept in this manner for the space of seven years.

PLATE CXV.—ENTOMOLOGY.

Order Hemiptera. Genus Chermes.

In insects of this genus, the snout is placed in the breast, and contains three inflected bristles; antennæ cylindrical, and longer than the thorax: wings four, deflected; thorax gibbous; posterior legs formed for leaping. Inhabits plants.

Chermes alni, Linn. Lat.

Antennæ varied with white and black; snout white, tipped with black: body whitish: wings white with brown veins.

This species occasions by its puncture, enormous scaly swellings or protuberances at the end of the branches of the pine.

Chermes buxi, Linn. Lat.

Green, with setaceous antennæ, and the wings yellowish-brown. The punctures of this insect make the leaves bend in towards each other at the extremity, forming a hollow knob in which the larvæ are inclosed. Inhabits the box, and other evergreens.

Genus Cimex.

Rostrum or snout inflected; antennæ longer than the thorax; wings folded together cross-wise; the wing-cases coriaceous on the upper part; back flat; thorax margined; legs formed for running.

Cimex lectularius, Linn. Lat.

This is the fœtid and nauseous house-bug or bed-bug, whose history is as well known as is desirable. It is the inhabitant of most houses; crawls from its lurking-places in walls and furniture, to suck the blood of those that are asleep during the night; in the day, it conceals itself. It is without wings, and the body of a reddish-brown colour. It is said to have an aversion to elder and tobacco.

Cimex auranturs, Linn. Lat.

Ovate; thorax armed. The colour is orange; the head, anterior margin of the thorax, marginal spots on the abdomen, and legs black. Inhabits China and other parts of India.

Genus Coccus.

The insects of this tribe have the snout seated in the breast, the antennæ filiform, and the posterior part of the abdomen furnished with bristles; the male has two erect wings, and is destitute of poisers: the female is apterous, or without wings.

The specific names of these insects are generally derived from the plants on which they live, and which furnish them with food.

Coccus persicæ, Linn. Lat.

Body glossy, and either of a reddish colour, tawny or black. Feeds on the *amygdalus persica*.

Coccus cataphractus, Linn. Lat.

Milk-white; eyes, antennæ, rostrum, and legs, ferruginous.

This insect is found among sphagnum and other mosses in boggy and turfy ground, and is most frequent in Scotland, Ireland, and the north of England, particularly in some parts of Cumberland.

Coccus quercus, Linn. Lat.

This insect is somewhat kidney-shaped, and of a brown colour. Found on the oak, *quercus rober*.

Coccus hesperidum, Linn. Lat.

The female of this species is a small oval insect, about the sixth part of an inch in length; the back slightly convex, with a smooth surface and a notch in the posterior part. It has six legs, and when young runs upon trees. The male is a very small winged insect, and less frequently observed than the female, which latter is extremely abundant, and often proves very injurious to the plants they infest. The species is originally a native of the warmer regions, and has been introduced into Europe with exotic plants.

Found generally on the orange, citron, and other plants of the same family, and on various evergreens reared in greenhouses.

Genus Nepa. Water Scorpion.

Snout inflected; antennæ short; wings four, folding crosswise, coriaceous on the upper part; the four legs are cheliform, or like pincers: the other four are formed for walking.

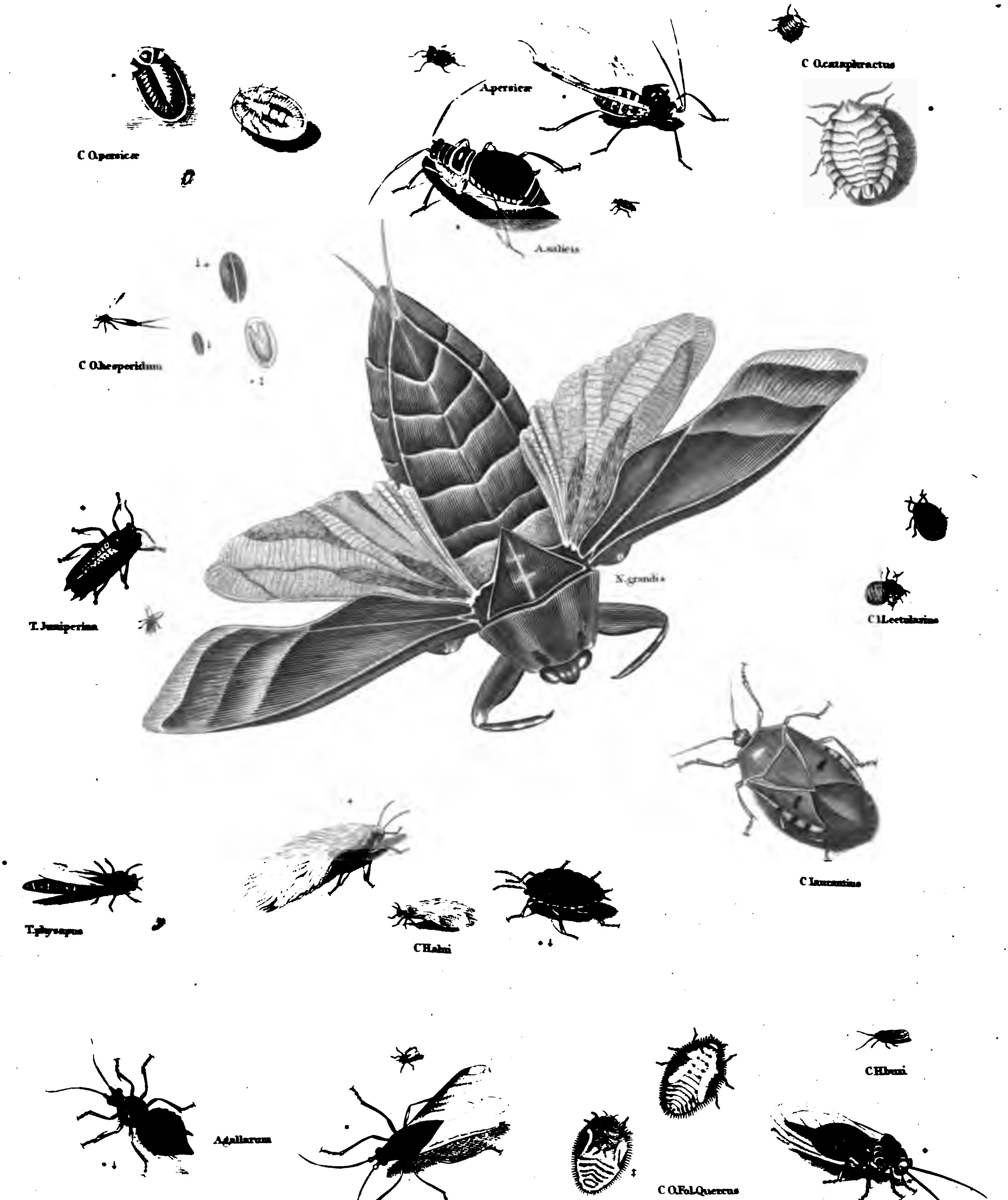
Nepa grandis, Linn. Lat.

Chestnut-brown, variegated with yellow. The antennæ are four-cleft, and the divisions are curved. This is the largest species yet known, measuring more than three inches in length. It is said to prey on tadpoles and young frogs. Inhabits South America.

ENTOMOLOGY.

Order Hemiptera.

GENUS *CHERMES*. G.*CIMEX* G.*COCCUS* G.*NEPA*. G.*THRIPS* G.*APHIS*.



* magnified
, female
: under surface

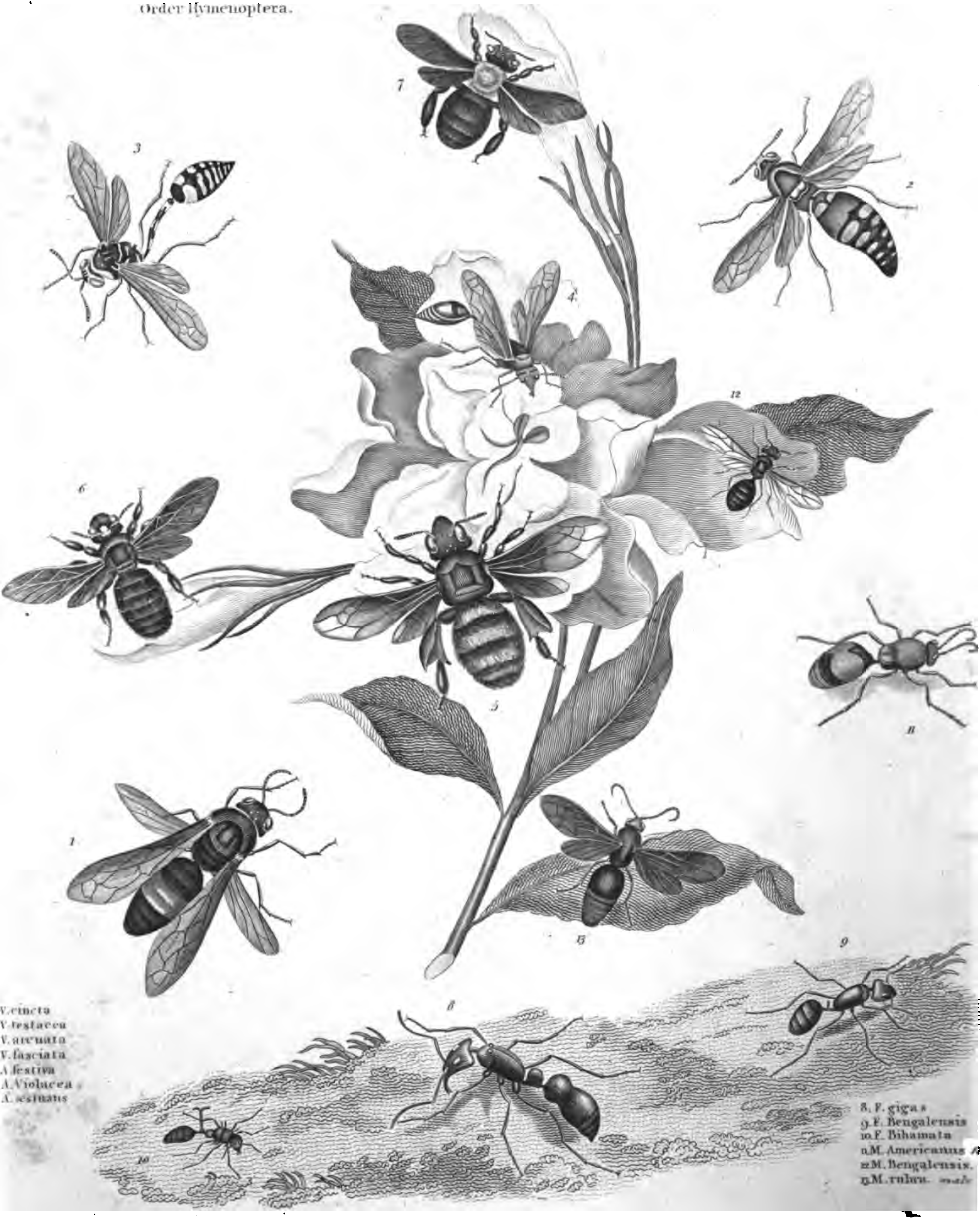
Linn. Syst.

ENTOMOLOGY.

Order Hymenoptera.

Genus VESPA G. APIS G. FORMICA G. MUTILLA.

PLATE 116.

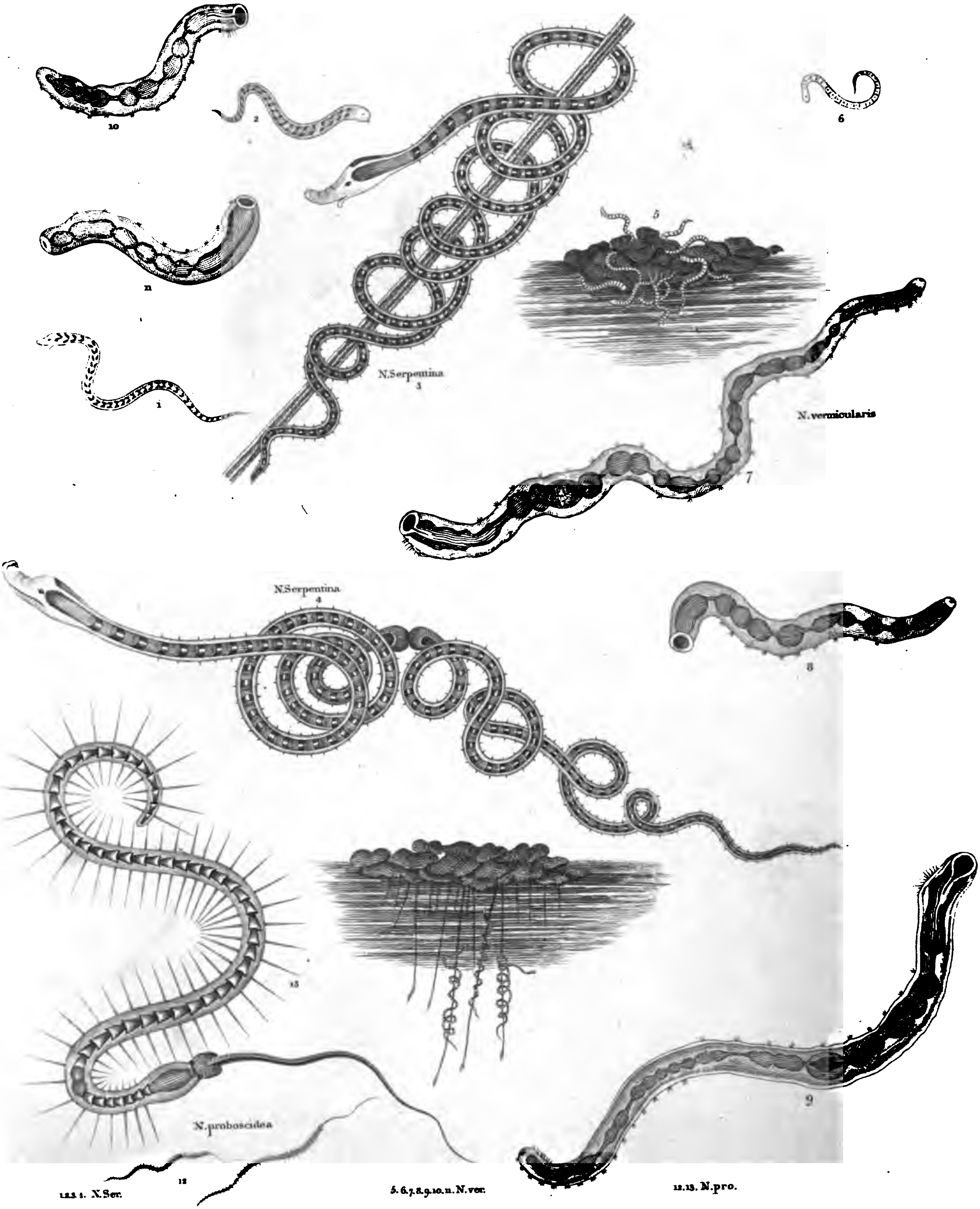


1. V. cincta
2. V. testacea
3. V. arcuata
4. V. fasciata
5. A. festiva
6. A. Violacea
7. A. æstuans

8. F. gigas
9. F. Bengalensis
10. F. Bihamata
11. M. Americanus female
12. M. Bengalensis.
13. M. rubra. male

VERMES.

GENUS *NAIS*.



1.2.3.4. N.Ser. 5.6.7.8.9.10.11. N.ver. 12.13. N.pro.

Genus Thrips.

Rostrum obsolete, being hidden within the mouth: antennæ filiform, and as long as the thorax; body slender, and of equal thickness; the abdomen reflexible, and often bent upwards; the four wings extended, incumbent, narrow, and crossing one another at some distance from their base. The thrips has six feet, and the tarsus of each foot has only two articulations.

Thrips juniperina, Linn. Lat.

With snowy elytra and brown body. Found in the galls of the juniper.

Thrips physapus, Linn. Lat.

With glaucous elytra or shell-wings, and black body. Found frequently on flowers in Europe.

Genus Aphis.

Beak inflected, sheath of five articulations, with a single bristle: antennæ setaceous, and longer than the thorax; either four erect wings, or none; feet formed for walking; posterior part of the abdomen usually furnished with two little horns.

They infest an endless variety of plants; and it is believed each species is particularly attached to one kind of vegetable only; hence each sort has been hitherto uniformly named after the individual species or genus of plants, on which it feeds; or if that could not be ascertained, that on which it had been found; for some species are rather uncommon and little known, though others are infinitely too numerous. The aphides are sufficiently known by the indiscriminate term plant lice; they abound with a sweet and grateful moisture, and are therefore eagerly devoured by ants, the larva of coccinellæ, and many other creatures, or they would become, very probably, more destructive to the whole vegetable creation, than any other race of insects known.

Aphis persicæ, Linn. Lat.
Aphis salicis, Linn. Lat.
Aphis gallarum, Linn. Lat.

PLATE CXVI.—ENTOMOLOGY.

Order Hymenoptera. Genus Vespa.

The characters of this genus are, the mouth horny; the jaw compressed, without proboscis; the palpi or feelers four, unequal, filiform; the antennæ filiform, the first joint being longer and cylindric; the eyes lunulated; the body smooth; the sting concealed, and the upper wings plicated. This is a very extensive genus, comprehending, in Gmelin's system of Linnæus, 159 species; but in the history and arrangement of this species there remains much confusion. We may observe in general, that they are remarkable, like those of the Apis or bee, for the dexterity with which they construct their nests, which in those of many species is of considerable size.

Wasps are not unfrequently dangerous and hurtful to many sorts of animals by their sting, in consequence of the pain and irritation that are thereby produced. The best remedies in these cases are probably the full use of ammoniated vinegar, or lead-water, as cold as possible to the parts, keeping them constantly wet with them by means of cloths wrung out of them.

Fig. 1. *Vespa cineta*, Linn. Lat.
Fig. 2. *Vespa testacea*, Linn. Lat.
Fig. 3. *Vespa arcuata*, Linn. *Eumenes arcuata*, Lat.
Fig. 4. *Vespa fasciata*, Linn. Lat.

Genus Apis. Bee.

The characters of this genus are, mouth horny, jaws and lip membranaceous at the apex; tongue inflected; palpi four, unequal, and filiform, antennæ filiform, and short; wings flat; sting of the females and neuters acute and concealed.

The common and well-known honey-bee belongs to this genus.

Fig. 5. *Apis festiva*, Linn. Lat.
Fig. 6. *Apis violacea*, Linn. *Xylocopa violacea*, Lat.
Fig. 7. *Apis æstuans*, Linn. *Xylocopa æstuans*, Lat.

Genus Formica. Ant.

Essential character; a little upright scale between the thorax and abdomen; males and females furnished with wings, and the neuters apterous or wingless.

Geoffroy distinguishes the insects of this genus by the structure of the antennæ; these, as he observes, being in the true formicæ, elbowed or broken into an angle in the middle, and having the first joint longer in proportion than the others; the stemmata or false eyes three in number, and the abdomen joined to the thorax by means of a short pedicle, or stalk.

These insects are interesting from their manner of collecting together and forming communities, excavating subterranean cells in which they deposit the food which is to nourish them through the rigours of winter.

Fig. 8. *Formica gigas*, Linn. Lat.
Fig. 9. *Formica bengalensis*, Linn. Lat.
Fig. 10. *Formica bihamata*, Linn. Lat.

Thorax four-spined; petiole of the abdomen with two curved spines.

The head is small and round; the antennæ long; abdomen sub-globular, black at the base, ferruginous; legs long and black; thighs ferruginous. Inhabits India.

Genus Mutilla.

Antennæ filiform; feelers four, of which the articulations are obconic, seated on the tip of the lip; the jaw is membranaceous at the tip; the lip is projecting obconic; in most species there are no wings; the body is hairy; the thorax very blunt behind; the sting is pungent and concealed.

Fig. 11. *Mutilla americanus*, Linn. Lat.

Black; abdomen with four yellowish spots, and three white lines. Found in South America.

Fig. 12. *Mutilla bengalensis*, Linn. Lat
Fig. 13. *Mutilla rubra*, Linn. Lat.

PLATE CXVII.—VERMES.

Genus Nais.

Several of the figures in this plate are magnified.

Nais serpentina, Linn. Lam.

Body serpentine, with red spiral intestines, and triple black collar. About an inch in length; the peduncles are warty, with three hooked bristles.

Inhabits Europe, in stagnant waters. Attaches itself, as do all the other species, to the stalks of aquatic plants.

Nais vermicularis, Linn. Lam.

Measures only about a quarter of an inch in length; the head is sub-clavate; it has no eyes, and the peduncles have five or six bristles.

Found in stagnant waters, adhering to duck-weed.

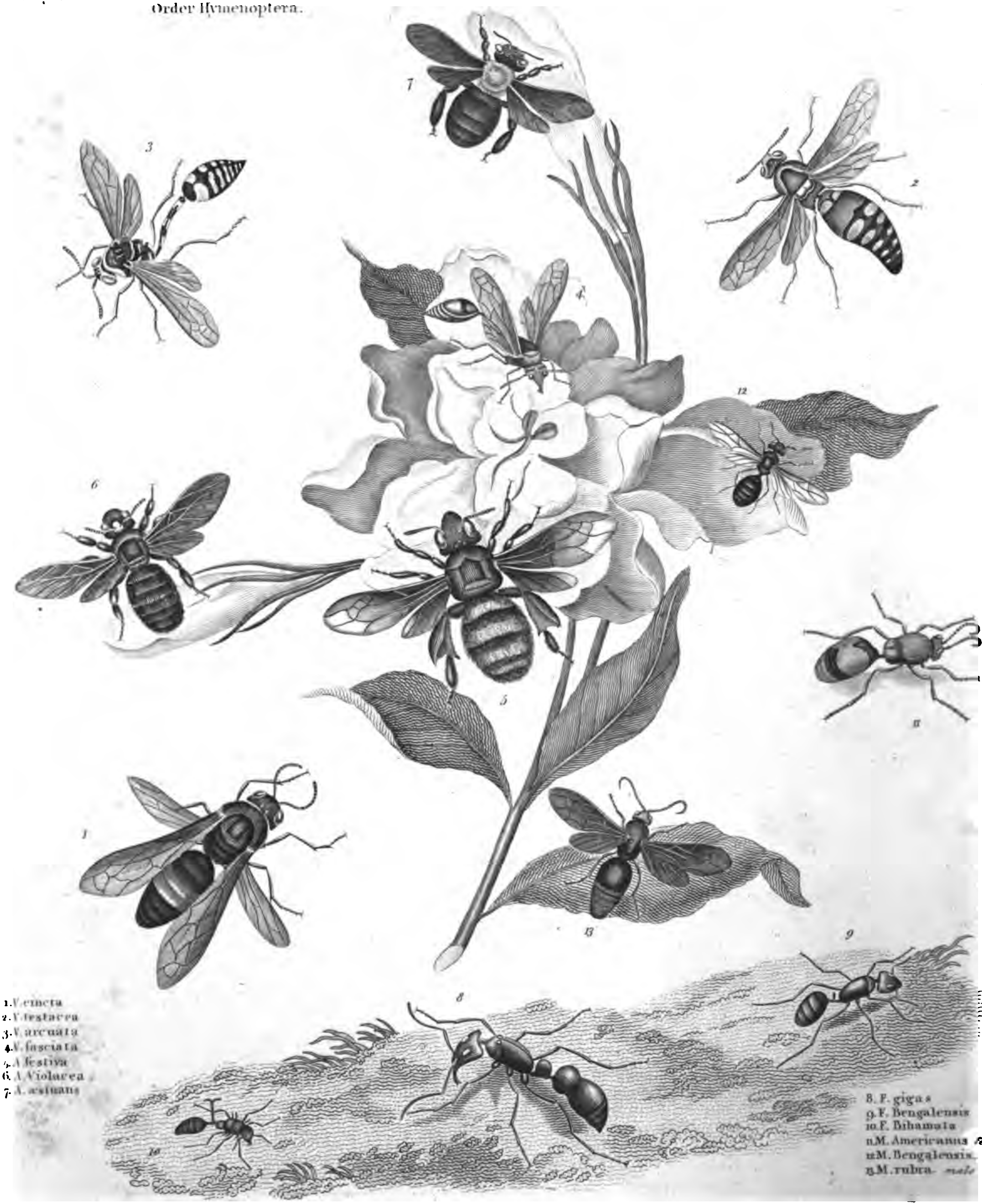
Nais proboscidea, Linn. Lam.

This species has single lateral bristles, and a very long proboscis. About three quarters of an inch long. The body is hyaline, with a blackish flexuous intestine; the segments with a single longish bristle on each side; the head is forked, and furnished with a mouth and tongue; the vent is terminal, and it feeds on invisible aquatic insects. Inhabits clear stagnant waters.

ENTOMOLOGY.

Order Hymenoptera.

Genus VESPA G. APIS G. FORMICA G. MUTILLA.



1. V. cincta
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4. V. fasciata
5. A festiva
6. A. Violacea
7. A. æstuans

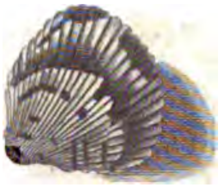
8. F. gigas
9. F. Bengalensis
10. F. Bihamata
11. M. Americanus *female*
12. M. Bengalensis.
13. M. rubra. *male*

Linn. Syst.

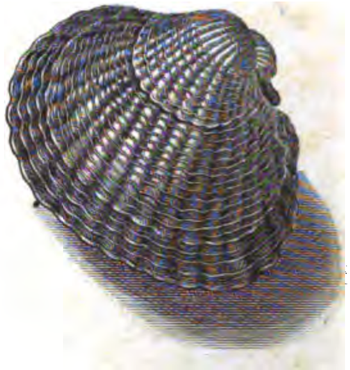
CONCHOLOGY.

GENUS *TELLINA* — GENUS *CARDIUM.*

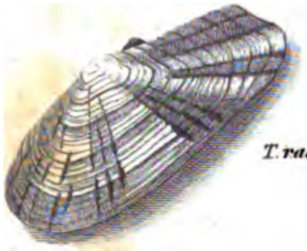
PLATE 118.



C. medium

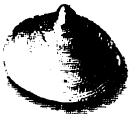


C. edule var.

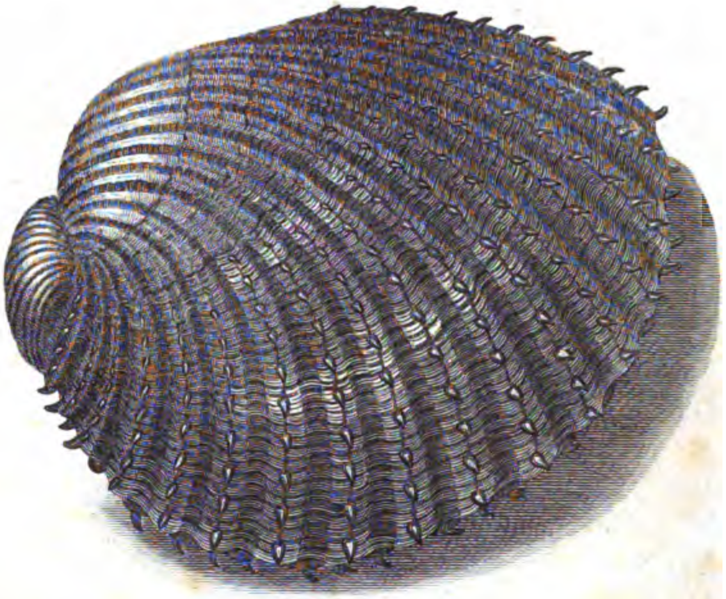


T. radiata

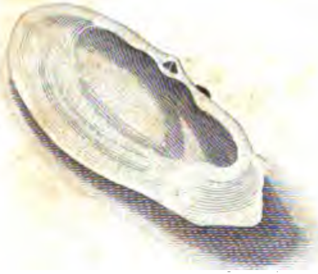
Tellina bimaculata



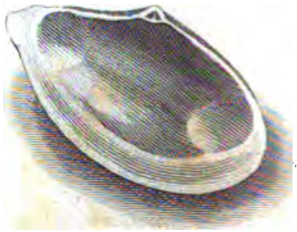
T. fabulata left side.



Cardium aculeatum

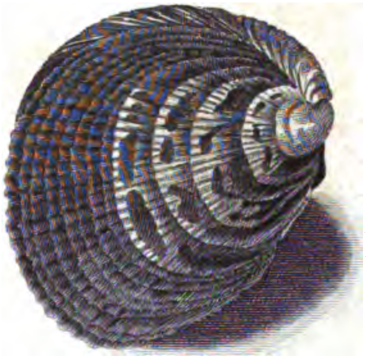


T. radiata inside.

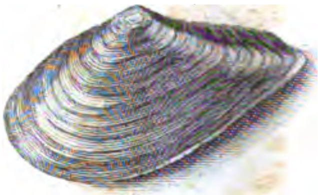


T. squalida inside.

T. fabula right side.



C. laevigatum

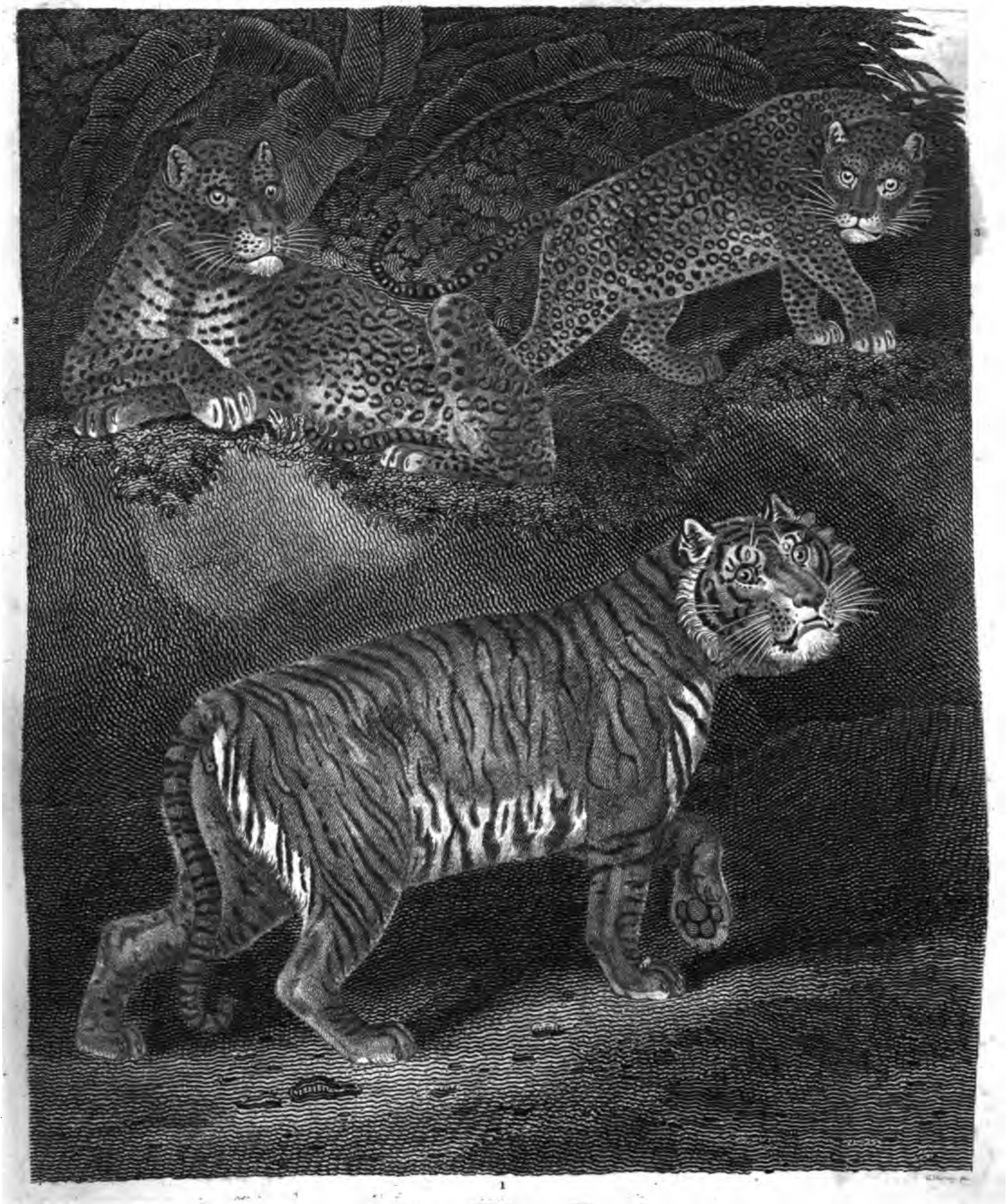


T. squalida

Wood sc.

QUADRUPEDS

CLASS Ist MAMMALIA _ *ORDER III FERÆ.* _ *GENUS FELIS*



1. F. Tigris. 2. F. Pardus. 3. F. Leopardus.

TIGER. PANTHER. LEOPARD.

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